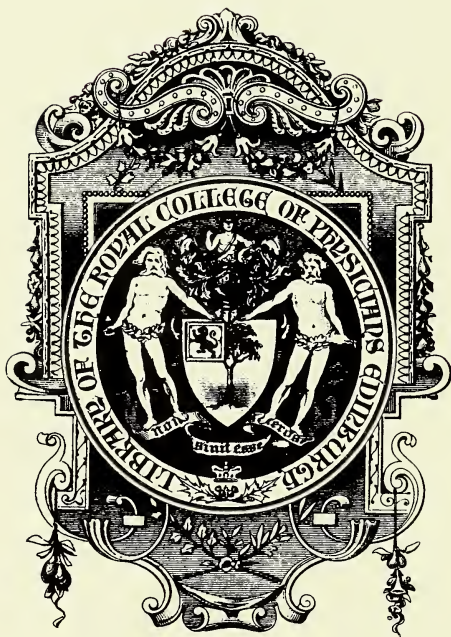


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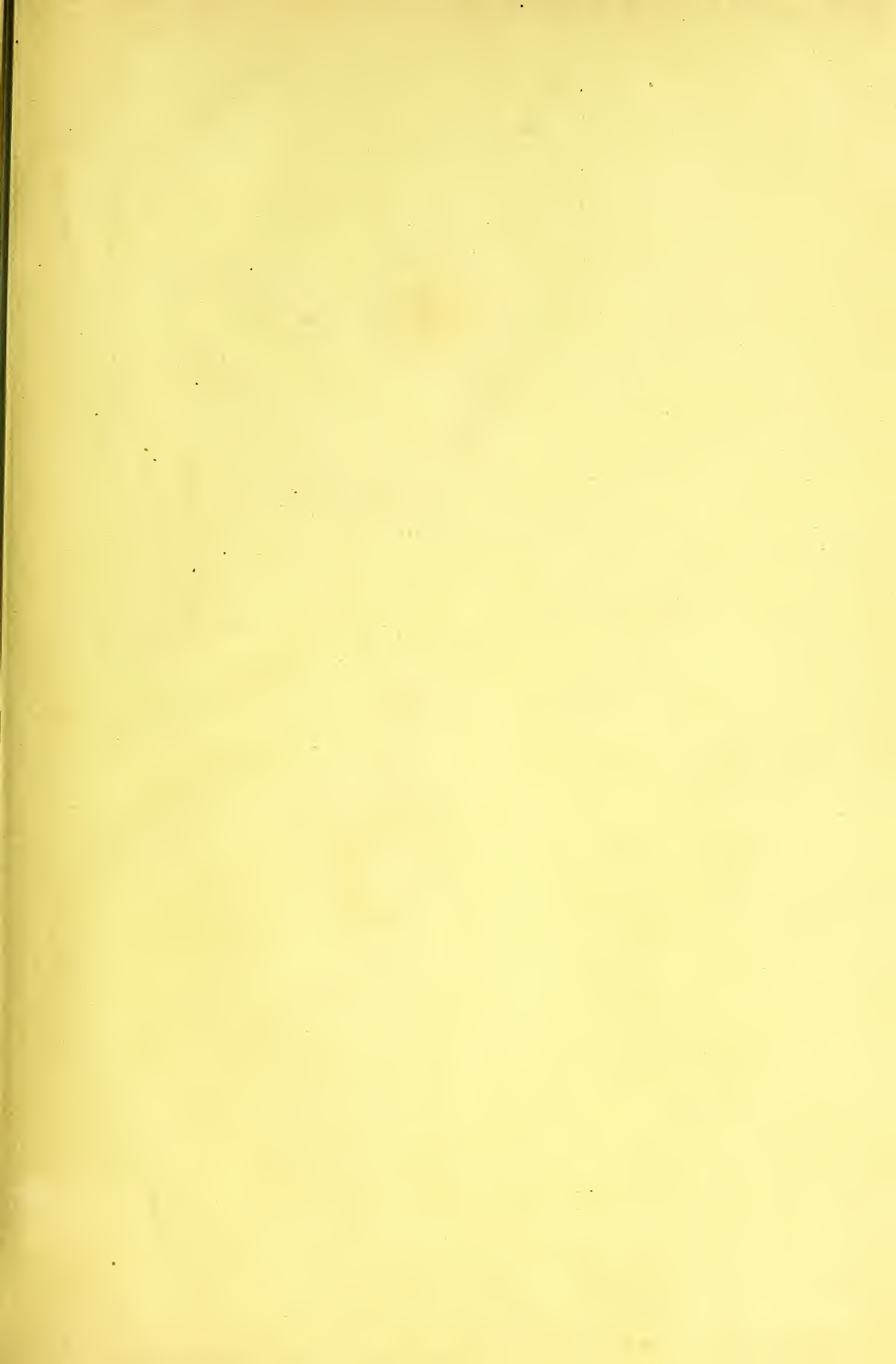


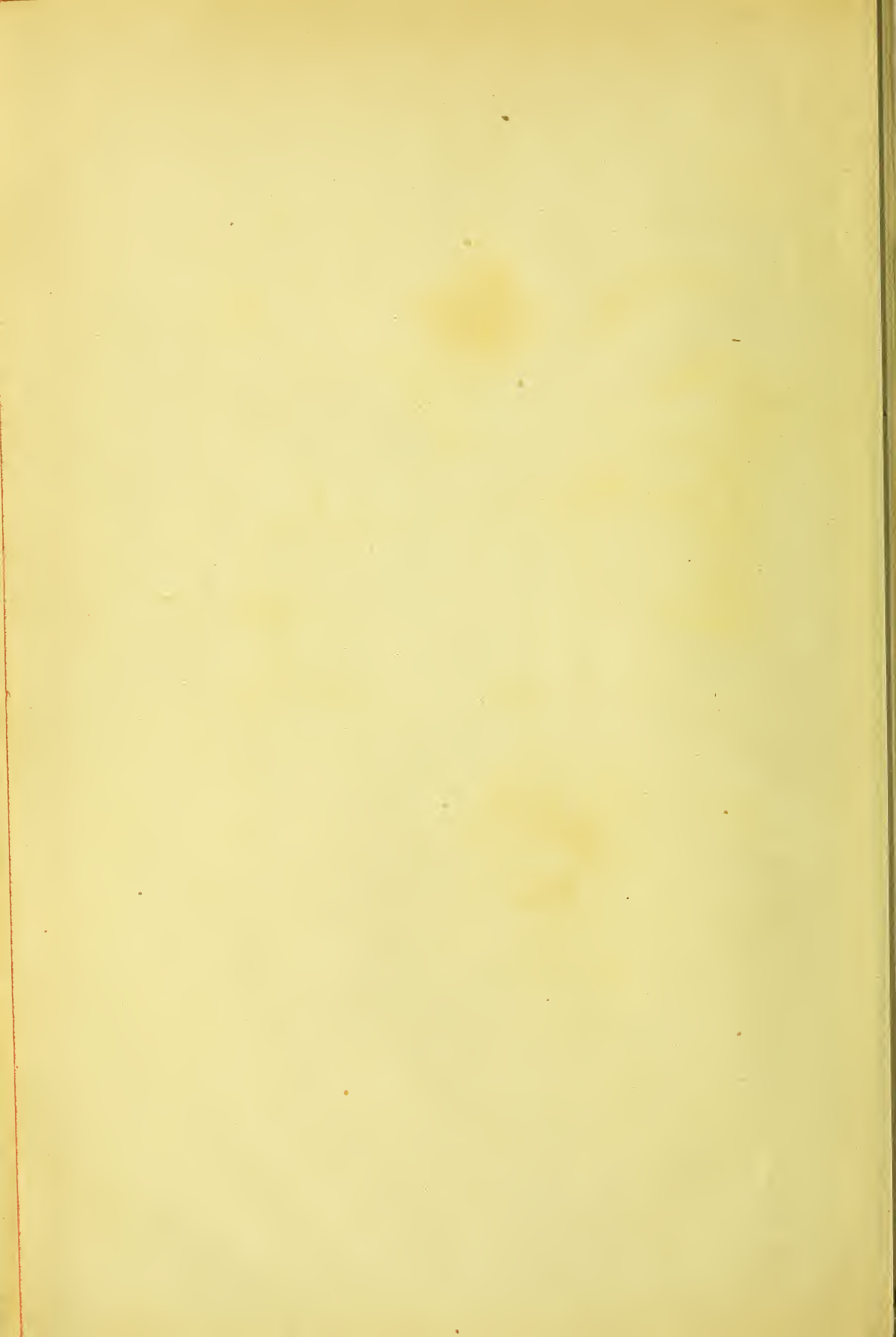
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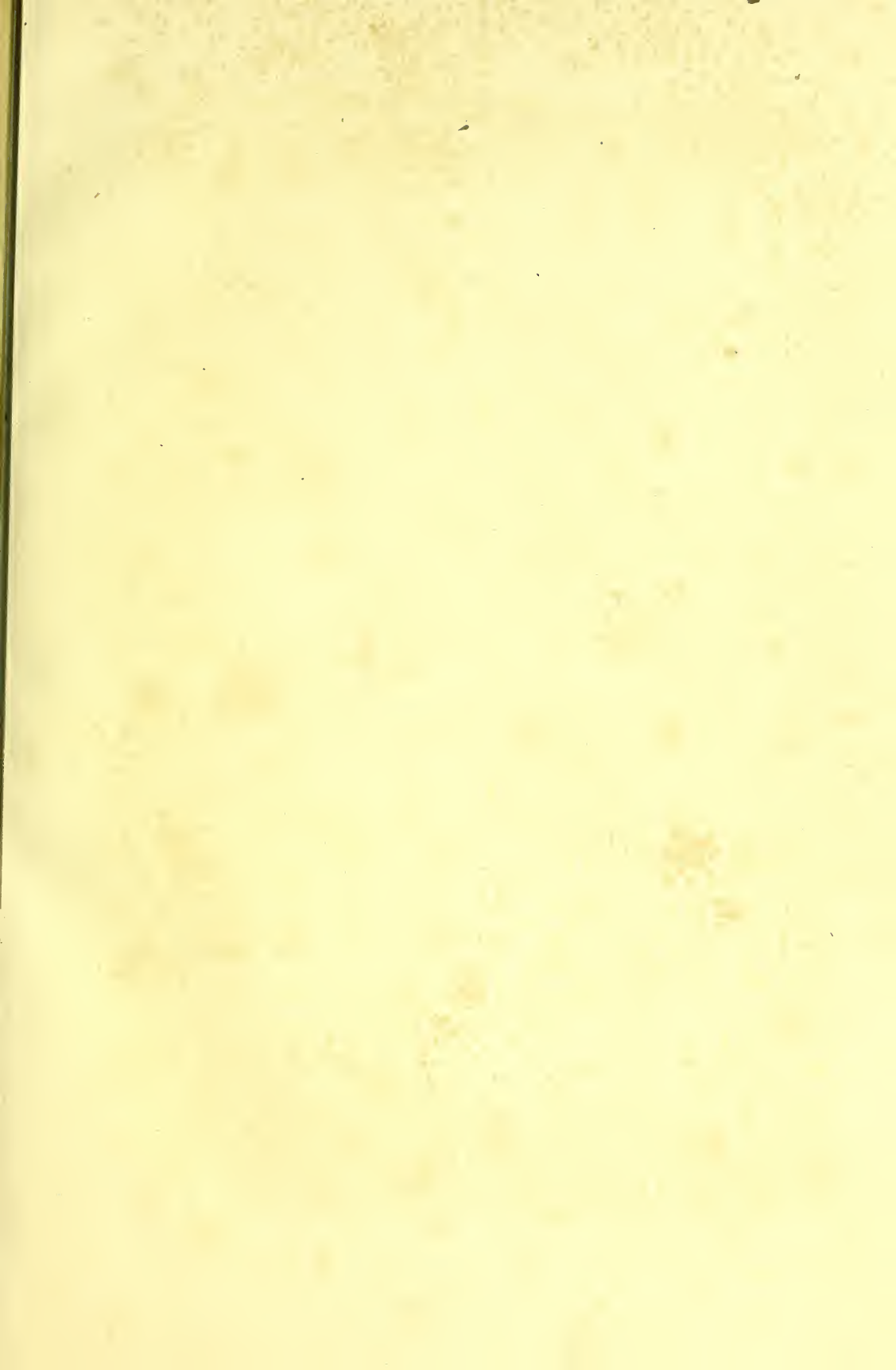
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DR. ANDREW WILSON.

The Editor

THE MODERN PHYSICIAN

BEING A COMPLETE GUIDE TO THE ATTAINMENT AND PRESERVATION OF HEALTH

Including Descriptions of the Causes, Symptoms, and Cure of Diseases and Ailments;
the Structure and Functions of the Human Body; Sick Nursing and Invalid
Cookery; Hygiene; the Practice of the Laws of Health and Muscular
Development; the Family Medicine Chest; the Care of Children
and Infants; the Health and Ailments of Women;
First Aid or Ambulance Work, etc. etc.

BY

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"LIFE AND SENSE," "BRAIN AND NERVE," ETC. ETC.

ASSISTED BY A STAFF OF EXPERT CONTRIBUTORS

*Profusely Illustrated by Coloured Plates and Models,
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IN FIVE VOLUMES—VOL. V

LONDON
THE CAXTON PUBLISHING COMPANY
84, 85 & 86 CHANCERY LANE, W.C.

Printed by BALLANTYNE, HANSON & Co.
At the Ballantyne Press

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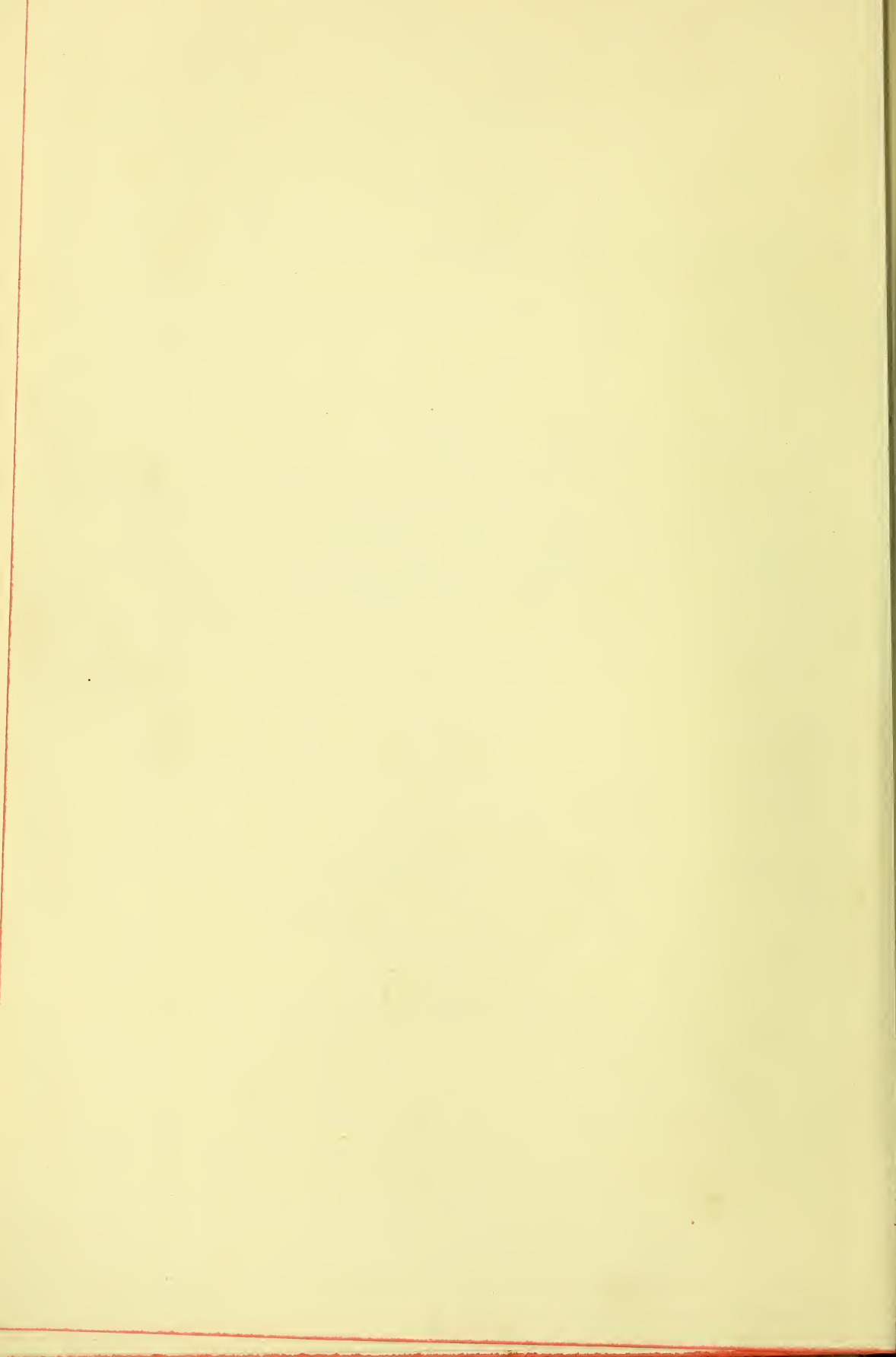
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THE MODERN PHYSICIAN

SECTION I

INTRODUCTION

THE SPECIAL FEATURES OF WOMAN'S LIFE

It may be said that the study of woman's health presents in itself a subject for consideration of a special character. Not merely does the difference of sex imply very considerable variations in respect of structure, but more especially do we find these differences extending to the development of special peculiarities in the mental disposition of woman as distinct from man.

The Origin of Sex.—In the first place a few words may be devoted to the question of *the origin of sex*. This subject has received of late days a very considerable amount of attention from physiologists. Indeed, it may be said that from the earliest periods of scientific discussion the nature of the causes producing one sex or the other has formed a topic of extreme interest. The older writers dating from the classical period assumed that the causation of sex lay in the difference of the semen or male fluid produced by one testicle as distinct from that of the other. In this idea of sex it is clear that the sole responsibility of determining whether the germ (or *ovum*) should pass in its development to the male or female side was limited to the influence of the male parent. Later views have, of course, made it clear that the influence of the female parent cannot by any means be left out of count. On the contrary, the part played by the male in the impregnation or fertilisation of the ovum is regarded by many physiologists as being of a secondary nature to that represented by the conditions under which the female germ-cell is produced. It has been a favourite theory of heredity, indeed, with many writers that the influence of the mother in determining not merely the sex but the constitution of the offspring, is much greater than that contributed from the paternal side. In so far as the origin of sex is concerned it may be said that no theory which at present appeals to scientific consideration is of a

thoroughly satisfactory nature. In the first place, we may note that up to a certain stage of development the *fœtus* (or unborn child) is sexless; that is to say, it possesses sexual organs of a generalised type. As its development proceeds, the particular sex it will exhibit is developed out of the general type of organs it originally possesses. Thus male and female organs of reproduction originate from a common stock, and it is possible to trace, as will be done later on, corresponding parts in the male and female respectively.

Theories of Sex.—The considerations which mostly concern us in relation to the origin of sex are the causes—if these are at all capable of being ascertained—which tend to throw the developing body of the young to the male or female side respectively. Some writers incline to think that the sex of the individual is determined at the moment when impregnation of the ovum or germ is effected; that is to say, when the male and female elements meet and mingle the one with the other. Other writers assert that the sex of the child is settled before impregnation of the ovum by the male. In this view, sex is pre-determined in the ovary, and the male influence is limited merely to starting its development. It must be remembered, as has been stated in a previous section of this work, that the human body arises from a minute germ or *cell* averaging in diameter the $\frac{1}{120}$ th part of an inch. This cell being subjected to the fertilising action of the male fluid, immediately undergoes a series of developments, the result of which is to convert the single cell into many. Out of these many cells, which may be considered to be the bricks of the future house, the body is formed. On one theory of sex, therefore, it is presumed that the act of fertilising the germ or ovum determines the sex. There is little support for this theory to be found in the facts of physiology, for what exact influence in so far as sex is concerned is produced upon the germ by contact with the male fluid, is an undetermined matter. This being so, it seems worse than useless to speculate regarding the origin of sex from an unknown basis. The theory has also been advanced by certain writers that it is the influence of the stronger parent which determines the sex of the child, this influence producing the opposite sex to the more robust parent. Thus a husband who is stronger than his wife is regarded, on this view of matters, as likely to propagate daughters. A woman, on the other hand, who is stronger or more physically perfect than her husband, may be presumed to breed sons rather than female children.

A Reasonable Theory.—In dealing with a subject which, assumedly, is to a certain extent incapable of proof, it is well that we should confine ourselves to natural processes represented in the

development of the body. We may assume to start with, in the absence of proof to the contrary, that the germ, or ovum, as it is represented in the female reproductive organs, is entirely sexless. When that ovum is impregnated by the male and has started on its developmental journey we have seen that it appears to pursue a defined course up to a certain point, still, however, maintaining its sexless character. Later on in development the male or the female sex, as the case may be, is specialised from the common type. In so far as our knowledge at present goes it would seem to represent the more reasonable view of matters to inquire what is the nature of the cause or causes which tend to throw a developing body on the one hand to the male side, or on the other hand to the female side. We will do wisely in all such cases if we limit ourselves to the list of causes which are well within our ken. One of the most important points connected with the development of an ovum or germ must undoubtedly be regarded as that of *nutrition*. The nourishment of the ovum or germ, even in its earliest stages, must form one of the most important conditions regulating its development. When an ovum is badly nourished, for example, we cannot expect to find that the resulting product will be of the same character as that originating from one which has received its full share of nourishment. The theory of sex which appears to the writer who originated it to be most reasonable, is that of regarding *the nutrition of the developing germ* as being the special cause of the origin of sex. The stronger ovum or germ will, on this theory, be more likely to develop into a male child than one which has been less perfectly nourished. The essence of this theory is to be found in the fact that, as regards man and the class of animals he represents, the males are larger and stronger than the females. It is different with the lower forms of life. In birds, for example, the female as a rule is larger than the male, and the same rule applies to animals lower in the Vertebrate scale. In mammals, on the other hand, we find a preponderance of bodily weight given to the male. Hence it is only reasonable to suppose that amongst the causes which determine sex, the better nourishment of an ovum must be regarded as of extreme importance.

Putting this matter of sex in a practical fashion we may conceive, for example, that in the case of the human female an ovum discharged at the time of the monthly "illness" or *menstruation*, and impregnated at once or soon after its development, by reason of its being a stronger ovum, will develop into a male. On the other hand, if an ovum is fertilised after menstruation has been concluded, it will be more likely to develop into a female child. In other words this theory of sex maintains that if a woman be impregnated before

menstruation commences, and therefore misses this period, the resulting embryo will probably be a male. On the other hand, if conception takes place after menstruation has concluded, when it may be considered that the ovum is less virile through its stay in the female organs, a female child may be expected as the result. It is to be noted, of course, that this explanation of the origin of sex is entirely theoretical. But facts are not wanting in its support. The earlier impregnation takes place, and the more robust the ovum, the greater likelihood exists of a male birth, this view being founded on the reasonable supposition already instanced—that it requires a stronger germ to produce a male than to develop a female. It may be reasonably concluded that the ovum or germ which has been only recently discharged from the ovary of the female will be a stronger germ, all things considered, than is represented at the close of menstruation, or after that process has ceased.

Sexual Differences.—The differences which exist between male and female are not limited to the structure of the body alone. They also include the consideration of the mental and intellectual variations noticeable between the sexes. Allusion has already been made to the fact that woman may be truly regarded as the “lesser man,” in respect that her body is smaller than that of the male. A comparison between the outlines of the male and female figure reveals in a superficial fashion certain sexual differences. Thus man’s body is the more erect, whilst the woman’s form differs from his in respect of the larger hips, due to the broader pelvis (Figs. 1 and 2), and also in respect of special developments of the curves of the breasts, of the abdomen and of the flanks. Even at birth it is found that the male infant is heavier than the female, and is also somewhat longer. Hence in connection with cases of difficult labour, anxiety is more frequently experienced in the delivery of a male child than in that of a female. In woman the trunk of the body is proportionately longer than in man, whilst the limbs in turn are proportionately short. A writer has summed up the structural differences between man and woman very aptly in the remark that woman’s body, taken as a whole, more nearly represents the infantile condition than does that of man. This view, stated in another fashion, might be expressed in the idea that woman represents the male body in a somewhat arrested condition of development.

Some other Differences.—There can be little doubt that the modification of woman’s body has reference to her function as the bearer of children. This is not merely found in the broader pelvis giving room for the enlargement of the womb when pregnancy occurs; it is also seen in connection with the development of the breasts and

also with reference even to the breathing movements. Thus in woman the movements of the ribs are much more pronounced and definite than in man. The rise and fall of the chest are much more definitely represented in woman. On the other hand, in the male sex and in children we find the muscles of the abdomen or belly much more distinctly brought into operation in the act of breathing. We see in this fact an accommodation which relieves the abdomen of a large share of breathing work in connection with woman's function in child-bearing. With respect to the mental differences between man and woman little requires to be said in the present instance, this being a subject which more especially concerns the psychologist than the physician. It may, however, be remarked that woman throughout

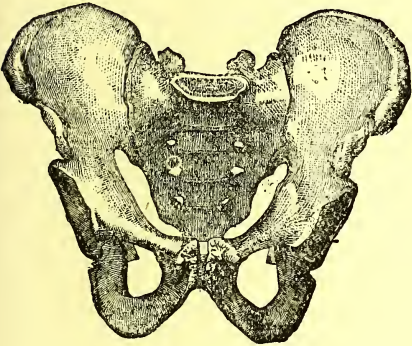


FIG. 1.—Male Pelvis.

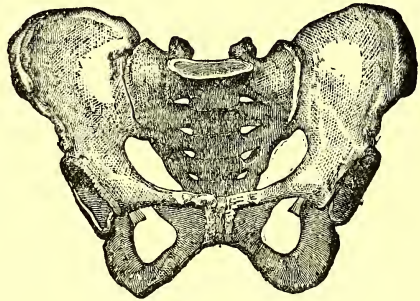


FIG. 2.—Female Pelvis.
Showing greater breadth than in the male.

is much quicker in her mental actions than is man. She will reach a particular conclusion by intuition, whereas man will attain the same goal only as the result of a process of reasoning. It cannot be denied that woman of late years has very successfully competed with man in many phases of life, and more especially in those which involve mental work. Man, however, practically gains the advantage over woman in respect of his stronger physical structure, adapting him better than his mate for the discharge of onerous duties and for warding off to a certain extent the effects of fatigue.

Sexual Selection.—When Darwin elaborated his theory of “sexual selection” as complementary to his great theory of the origin of species, he laid great stress on the fact that the differences between one sex and the other bore a very close and intimate relation to the bearing of offspring and the upbringing of the young. Throughout the considerations presented in this volume regarding the special functions of woman in the matter of child-bearing and

preservation of health, there can be little doubt these differences should be clearly borne in mind as explaining the great bulk of the characteristics wherein woman differs from man. One of the dangers of modern life, it may be said, is that which tends to depose woman from her functions of wife and mother and to approximate her more nearly to the male type. It is undoubtedly a fact that in these latter days the duties and functions of motherhood come less prominently into vogue in the life of woman than was the case in previous years. If the theory of evolution be applied here, it is easy to conceive that in due course of time the human race, in virtue of the abrogation of the functions in question, will probably find represented in its women beings who are less typically females than were their sisters of previous generations.

Epochs of Woman's Life.—One of the most important duties of the sanitarian and of the teacher of hygiene at large is that of preventing disease. This fact has already been abundantly illustrated in preceding sections of this work. More especially it will be shown in the section dealing with *the care of infancy* that strict attention paid to the upbringing of the infant is the only means of providing the growing body with the chance of developing into the healthy adult. It may be said that a very special hygiene applies to the care and upbringing of the female child. Beyond the period of infancy she is subject to health rules and laws differing materially from those which regulate the existence of the male. As the female child grows, her particular constitution requires to be definitely studied by those responsible for her upbringing. Here it may be remarked that a very considerable amount of ignorance, carrying as usual in its train much disaster, is exemplified by mothers in the care of their girls. It is needful to impress this upon readers, because a vast amount of preventable disease may be avoided by attention to the ordinary hygienic laws which specially apply to the case of girls. There is little difference to be noted in a family between the upbringing and general health regulation of the lives of boys and girls up to the age of twelve or thirteen years. The girl will participate in the games of the boys, and will be treated by them as a comrade. Both, so far, may be regarded, in one sense, as sexless.

The Girl.—When, however, a particular age is reached—that of *puberty*, as it is called—the girl's life, so to speak, branches off on a way of its own. It is then that the particular sexual characteristics which mark the female begin to be developed. The unity of tastes and habits seen in boys and girls in early life may well be regarded as reflecting that commonness of origin to which we have already alluded in the case of the cause of sex. It would seem, there-

fore, that not merely in respect of the early development of the body, but likewise with regard to the differentiation of sexual features later on, that these special characteristics develop from a common stock. The care of infancy is discussed in a separate section of this work, so that we may pass the stage when the child merges into the girl. It is then as we have seen that puberty approaches, and that changes of the utmost importance in the history of the girl may be said to occur. She becomes less inclined to enter into the boys' games and pastimes. Her general attitude becomes of a more shy and retiring character. She begins to be troubled by certain vague sensations which have reference to the beginnings of her duties and functions as the future woman and mother. Her figure alters, and from the angularity which marked its earlier development there is produced a greater fulness in certain regions of the body. The breasts become better developed, and the curves of the haunch also tend to become more prominent. All these signs and symptoms have reference to the establishment of that particular function which we term *menstruation*. By this expression is meant the commencement of the sexual function peculiar to her sex. It is not here intended to imply that because a girl "menstruates" she is necessarily to be regarded as capable of becoming a mother. The commencement of menstruation does not necessarily correspond with the period of fitness for marriage or motherhood. That process prepares and paves the way for the discharge of the important duties of the woman by a gradual development of those functions of the female body devoted to the work of reproduction of the race.

Menstruation.—By the term *menstruation* we imply the periodical discharge of blood from the generative organs of the girl or woman. In ordinary parlance this function is denoted under various terms. It is spoken of in common language as the "courses," but is more generally indicated by saying that the girl is "unwell." It must be noted that the discharge of blood is a mere sign and symptom of a much more important work proceeding within the body of the girl. This particular function is concerned, in the opinion of most authors, with the ripening of the *ova*, or *germs*, which it is the particular function of the woman to provide. Each of these *germs* or *ova* is to be regarded as presenting us with the foundation of the body of the child; that is to say, when such a germ or ovum has been fertilised or impregnated by contact with the fluid of the male, it is then placed in a position in which the development of the *fœtus* or *embryo* in the womb takes place. The Latin expression, *menses*, has been sometimes applied to the occurrence of menstruation, this word being derived from the fact that the menstrual flow appears once a month.

The Origin of Menstruation.—It is an extremely difficult matter to account for the monthly occurrence of what may be called the ripening of the ova (or “eggs”) in the woman accompanied by a discharge of blood from the womb. The only theory which has been advanced to account for the establishment of this peculiar function is that which may be found in the works of Darwin. He believed that the periodical occurrence of menstruation might be explained on the view that as ancient ancestors of the human race, in the shape of marine animals, were subjected to the influence of the tides, and since the tides are regulated by the phases of the moon, a periodicity in the functions of the higher animals was thus transmitted from their lower and far-back neighbours. Menstruation is not limited to the human species. The lower animals exhibit periodically in the same way what is called *heat* or *rut*. Such an exhibition of what may be called the ripening of the sexual instinct is seen in such creatures as horses, dogs, and cats. Amongst monkeys, such periods may be marked by the discharge of blood from the sexual organs. In the lower animals, the period of heat is that at which the female readily allows or encourages the access of the male. After the female has been impregnated by the male animal, she becomes pregnant, and during the whole of this latter period may exhibit an absolute distaste for the society of her mate. In the lower animals, as in woman, the period of heat, or menstruation, may be regarded as that during which there is a greater liability to conception than exists at other times. Indeed, as the result of experience, we might express the opinion, amounting almost to the statement of a law, that conception is much more likely to occur just before, or just after, a menstrual period.

The Health of the Girl.—The opinion may be very strongly expressed that a vast amount of injury, and also a large amount of disease, is produced through the ignorance, or carelessness, or both, of mothers in neglecting to teach their girls how their health should be conserved and attended to on the first occurrence of menstruation. An extremely false sense of modesty mostly prevents mothers from informing their girls of the nature of the changes which their bodies are undergoing at the period of puberty. One may readily conceive the nervousness, alarm, and irritation of the young girl who, having been kept in ignorance of the occurrence of menstruation and of its nature, is left entirely without advice in the regulation of this important function. One cannot speak too strongly of the duty of every mother to instruct her girls in the nature of this particular bodily habit. Cases are known to medical men in which a whole life of ill-health has resulted from foolish attempts on the part of girls to restrain or arrest this natural function. In one case known to the writer, a

young girl, anxious to go to a ball on the day when menstruation was due, took a cold bath, and placed her feet in cold water for a considerable time, with the effect truly of arresting menstruation, but also of bringing on illness, which caused her to remain an invalid for some years. Such cases are lamentable to contemplate, seeing that, just as a mother should be careful in her attention to the ordinary life and health of her girls, in respect of, say, the state of their bowels, their skin, their hair, their clothing, and other details, so she should consider it part of her bounden duty towards her offspring to inform them regarding the nature of a function most intimately associated with their future life and health.

Health Rules.—At the onset of menstruation, the hygienic rules for the guidance of the girl's life are very plainly set forth. Menstruation is a function which, it should be clearly understood, means so much to the life of the girl that almost every organ of the body is affected by its onset. Hence parents should be very careful that at this particular period of the girl's life all mental stress or strain should be avoided, overwork of every kind being absolutely prohibited. The life of the girl at this period should be marked by quietness and by rest. A certain amount of exercise is not merely advantageous, but highly necessary. Due attention to all the functions of the body, and especially to the action of the bowels, also forms a part of the régime. The girl, as has already been argued, should be told plainly the nature of the new function which has appeared in her life, and should be taught above all things that it is of a purely natural kind, that it has reference to her future life, and that any attempt to interfere with it is not merely to be regarded as unnatural, but as practically a criminal proceeding. The food should be of a plain non-stimulating character, but of sufficient amount. Later on in this section of the work reference will be made to ailments connected with the menstrual function; but it may be here advised that where any special pain exists, or where there appears to be unnecessary delay in the establishment of the function, a medical man should be at once consulted. The advice of a wise family doctor on occasions of this kind is calculated to save much future pain, misery, and disease.

The Occurrence of Menstruation.—In Great Britain the first appearance of menstruation takes place, in the vast majority of cases, at about the fourteenth year of life, but, as in the case of other conditions of existence, great variations may be observed. What has been well called the "personal equation"—that is to say, the special peculiarity of constitution of the individual—has much to do with the establishment of this function as in other matters of existence. It is not uncommon, for example, to find that some girls menstruate for the

first time at the twelfth year of life. Conditions of life and personal constitution also appear to affect the period of oncoming of the menses. Those girls who are brought up in towns and cities appear to menstruate at an earlier date than those who live in the country. In the higher ranks of society, as a rule, menstruation appears earlier than amongst the masses. It is generally considered that in girls of dark complexion menstruation tends to appear at an earlier date than in those of light complexion. In tropical climates girls menstruate for the first time much sooner than those brought up in temperate latitudes. Whether this latter fact is due to the influence of climate or not is an open question. In warm climates, for example, marriage is often contracted at a very much earlier age than with us; hence it may be that the influence of such early unions, transmitted from one generation to another, may hasten the advent of the function we are considering. Some physicians incline to the opinion that the first menstruation is more likely to occur in summer than in winter, and some have gone the length of asserting that menstruation tends to appear more frequently during the moon's first quarter than at full moon or new. Another rule which has been laid down regarding this function, is that which asserts that the earlier the monthly flow appears the sooner will it cease; so that what has been called the "change of life" may be regarded as likely to occur sooner in a woman who begins to menstruate early than in one in whose case the advent of the function was delayed. Certain statistics have been collected showing that in India menstruation begins on an average at about twelve and a half years. On the other hand, in the case of Eskimo women menstruation may be delayed in its appearance until the twenty-third year of life. In the same way it may be held that the period during which menstruation lasts each month tends to be longer in warm latitudes than in cold climates. Thus in the case of women in the Arctic circle, the average duration of menstruation is only from one to two days.

Periods.—The menstrual period occurs every twenty-eight days, the duration being counted from the commencement of one menstruation to the beginning of the next. Great irregularities are, however, noticeable in respect, not merely of the occurrence of menstruation, but also with regard to its duration. Many women calculate the period when menstruation is due from an ordinary calendar, that is, by the day of the month. The calculation, however, in the case of a healthy woman should be made, not by the calendar month, but by the lunar month. It need hardly be said that during pregnancy the menstrual flow is suppressed. Indeed, one of the earliest signs of pregnancy is the missing of the menstrual period. When the child is

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being nursed the menstrual flow is also absent, a fact which is taken advantage of by many women in the shape of prolonged nursing of the infant in order to prevent the recurrence of pregnancy.

As has already been stated, great variations exist, not merely in respect of the regularity of the oncoming of menstruation, but also in the matter of the duration of each period. It may be held that the average duration of the period is from four to six days, this calculation being made from the first appearance of the discharge of blood until its cessation. Much here, however, depends on race, climate, and individual constitution. Some women menstruate for two days only, others exhibit an average period of from four to six days. In others, again, a period of seven days may be regarded as representing their normal time. Where menstruation is continued beyond four to six days, or still more where a woman menstruates more frequently than once a lunar month, the existence of some ailment or other may legitimately be suspected. In this case advice of the character to be found in another section of this work, dealing with "Disorders of Menstruation," must be obtained.

Features of Menstruation.—The features of menstruation include a number of signs which point to the widespread influence of this function on the body at large. In some women menstruation occasions little or no disturbance of the system; in other cases the onset of the periods occasions certain marked symptoms. Flushings of the face are extremely common, and a rise of temperature is found in the vast majority of cases. The breasts become more tender, and sensations characterised by a fulness about the lower part of the body may also be present. In dark-complexioned women the skin under the eyes may exhibit a development in the way of deepened colour. Experts also note that the voice of the woman may be materially altered during the monthly period. In some women of a neurotic or nervous type the disposition may alter in marked fashion during menstruation. A high degree of irritability of temper may not merely mark the period itself, but may also precede it. It will be understood that the typical menstrual period, whilst marked by a certain slight derangement of the system, should be gone through and ended without pain. Where actual pain exists—a feature not uncommon before the onset of the period—we may suspect some derangement or other to exist. Later on, under the heading, "Disorders of Menstruation," it may be shown that such derangements may arise from some condition affecting the womb itself or bearing a relation to other organs included in the reproductive system. With respect to the quantity of blood which is given off during the menstrual period, variations exist here as in the duration of the period

itself. In a natural menstruation the quantity of blood which escapes will vary from four to six ounces. The flow of blood is at first of slight character and is more or less mixed with *mucus*, or the natural secretion of the passages. Later on, the quality of the secretion is masked by the appearance of pure blood itself. Menstruation is apt to be more profuse in women or girls who lead a luxurious existence. As a rule, amongst the masses, except where disease is present, the flow is greater than in the higher orders of society. The blood itself is of a fluid character and shows little tendency to clot. In the latter case, however—not an infrequent occurrence—some disorder of menstruation may be regarded as existent.

During the period of menstruation it is important that the girl should wear a diaper. The best materials for this purpose are those composed of some sanitary fabric in the shape of medicated lint. These are not merely of a warm character, but are highly absorbent, this last being a quality of important nature. The cost of these sanitary towels is so small that they can be burnt after use. Absolute cleanliness should be practised during the period of menstruation. Hot baths had better be avoided as they tend to increase the natural rate of discharge. The diapers should be changed as often as necessary, and the external parts may be bathed morning and night, either with tepid water plain, or with warm water in which a few boracic acid crystals have been dissolved. These measures will effectually prevent any annoyance apt to arise from the presence of the secretion in question. If any irritation of the parts exist nothing is more useful by way of counter-acting this fact than the use of a simple dusting powder.

The Care of Health during Menstruation.—In so far as the establishment of menstruation is concerned, it may be gathered from the preceding remarks that the main object, both of the mother and of the girl, is that of securing that the first periods shall be passed over painlessly, and that each succeeding period will be looked forward to without dread. It may be assumed that if menstruation be regularly established and if the patient's life and health in other respects be duly regulated, no painful symptoms will appear. Irregularity may be looked for in many cases, however, a fact which many physicians are inclined to attribute to the somewhat artificial mode of life which is led by civilised peoples. If a healthy young girl's life be duly regulated, as has been already suggested, and if, before and after her periods, care be taken to avoid undue exercise and especially mental excitement, the menstrual function, once established, will continue to be discharged without pain or inconvenience. During the first period rest is of extreme importance by way of assisting the due and natural establishment of the function. It is noted by physicians

that when a girl is compelled during her first period, as many women are, to engage in severe work either of a physical or mental kind disturbances of menstruation are much more likely to ensue. We must never forget that the important function we are discussing practically represents a very important "habit" of body. Just as sleep is a natural habit and as sleeplessness represents an abnormal habit, so we may conclude that menstruation is physiologically a habit of the female body which requires care at its commencement in order that it may be made to discharge its duties in a normal and natural fashion. Where the habit has been disturbed or deranged we can readily understand how its replacement by irregularity appears in such a case as a very natural result.

Ovulation.—From what has been said regarding this most important function of menstruation, its high importance in the life of the girl can be fully realised. Reference has already been made to the fact that *menstruation*—recognising by this term the monthly flow of blood from the womb—is a mere symptom of a deeper and more important work proceeding within the body of the woman. In discussing the generative organs of the female, due reference will be made to the important part played by two organs known as *ovaries* in connection with the reproductive function. The ovaries are, so to speak, the egg-producing organs. In them are elaborated the "ova" or "eggs," each of which, when impregnated by the male, is capable of developing into a child. It may be said that at a certain period in each month the ovaries part with a certain number of ova. Hence the term *ovulation* is applied to indicate the ripening and discharge of an ovum, or egg, from the organs in question. It is not needful for the present to describe how this minute body, averaging, as has been said, the $\frac{1}{120}$ th part of an inch in diameter, is conveyed to the womb, wherein the further development, converting it after impregnation into the child, is carried out. Sufficient to say that menstruation is generally regarded as the outward and visible sign of ovulation. Hence it is that the occurrence of menstruation is regarded as a sign that the girl or woman is capable of bearing a child. At the same time it must be noted that many authors are of opinion that, whilst menstruation is undoubtedly a sign that ovulation is proceeding, the two processes are not to be regarded as essentially connected. Thus it is held that the discharge of eggs from the ovary takes place independently of menstruation altogether. Pregnancy may occur, for example, before menstruation has appeared, and it may also happen during the period of suckling, when, as we have seen, menstruation is temporarily suppressed. Probably the most philosophic way of regarding menstruation from a modern point of view, is that of looking upon the process

as one undoubtedly connected with the preparation of the womb itself for the reception of the ovum or egg which is destined to pass through its development within that organ. Menstruation has, indeed, been compared by more than one author to a "labour in miniature." There is no doubt that the inner coating of the womb is shed during menstruation and duly replaced; so that if we regard menstruation and the flow of blood as measures of preparation on the part of the womb for the duty and function of harbouring and developing the child that is to be, we may employ the words of an author who aptly calls menstruation the preparation of the nest for the nestling. In this view, whilst we see that the important function involved is the escape of an egg or germ from the ovary, menstruation may be considered as independent of the ovary's work; but at the same time it may be regarded as being connected in an intimate degree with the preparing of the womb for the reception of the impregnated ovum. This view probably expresses the most modern and most widely recognised conception of the connection between the two functions.

The Woman and the Wife.—There are no rules of a hygienic kind specially adapted for the care of the health of the girl or of the adult woman. The same laws which regulate the health and physical welfare of the male adult may be said to apply in a general way to the case of the woman. The living of a regular and simple life, the avoidance of excess in the matter of foods and drinks, the wearing of suitable clothing adapted for each season of the year, the breathing of a pure atmosphere, and attention paid to the functions of the skin and bowels, may be said to sum up, in a rough and ready but accurate fashion, the chief points connected with the regulation of the healthy life of either sex. Beyond these general rules, however, we have to take into consideration certain special features applicable to the case of the woman. Reference has been made in another part of this work to the injurious effect of tight-lacing, for example. This fashion is undoubtedly responsible for a very large amount of ill-health and disease. It is all the more to be condemned because the exact source of the ailments caused is not often properly appreciated. Compression of the chest unduly by means of a corset tends not merely to limit the chest capacity and to restrict the movements of breathing, but also causes the displacement of organs situated in the abdomen. Thus the liver, stomach, and spleen are pressed downwards by the undue constriction, and, in turn, serious effects are produced on the womb itself. Disorders of menstruation are in many cases to be attributed to this habit of tight-lacing, and it may be added that much of the constipation with which women are unfortunately too frequently affected is also traceable

to this cause. It can readily be seen that undue compression of any part of the body must tend in time to produce permanent distortion of the parts affected. If among such parts be counted some of the most important organs of the body, we may cease to wonder at the existence of what has been graphically described by a writer as "the little health of women." By this expression the writer implies that condition only too frequently represented in woman's health, where, whilst she is not exactly ill, she never feels perfectly well.

Marriage and Health.—The period of womanhood naturally merges into other phases represented by those peculiar to the wife and proper to the mother. If we consider that marriage and the propagation of children constitute the physiological aims of every woman's life, and that she is thus physiologically to be regarded as an important unit of the race, we must logically regard her career as culminating in a sense in the duties pertaining to these last mentioned states. It is not to be contended that every woman can attain to the happiness of the marriage state or to the dignity of motherhood; nevertheless, from the scientific point of view, the course of every woman's life must be held to include these extremely important functions. It need hardly be said that only the healthy woman should marry. In a higher state of civilisation than that to which we have attained, it may be possible to influence public opinion to such an extent that the marriage of the unfit may be prohibited as a crime against themselves and still more against society. In certain States in America attempts have been made to legislate in this direction. Whether such laws will be obeyed even by enterprising Americans, is of course quite another matter. The sentiments which have suggested such legislation are all worthy of the approval of those who have the welfare of the race at heart. Nothing can be more foreign to the spirit of hygienic science, or more repugnant to the common sense of all educated persons, than to witness the union of persons whose bodies are either originally imperfect or deformed, or who suffer from constitutional disease. The union of epileptics, consumptives, scrofulous persons and the like, can only be productive of social disaster, in the sense that offspring must be born into the world in their turn suffering more or less directly from the effects of the defective parental constitutions. Even if, as has been shown in the section of this work devoted to the subject of "inheritance," much may be done by careful living to fortify defective constitutions, it is none the less an ideal to be regarded as worthy of close attention that only healthy persons should marry, thereby assuring the provision of healthy successors to carry on efficiently the world's work.

Age for Marriage.—With regard to the *age* which may be con-

sidered most proper for marriage, cases differ widely. As has been said, because a girl of tender years has menstruated and is therefore capable of becoming a mother, it is not to be held that of necessity she should assume the functions of maternity. Nature has to prepare the girl slowly and gradually for the functions of motherhood, just as in the matter of the development of the skeleton and of other parts of the body a slow and gradual progress towards the perfection of the adult is to be noted. In warm climates, it has well been said, women marry early but fade rapidly. The golden rule to be observed here is that a woman should not become a wife until she has attained adult age. Marriage involves serious responsibilities, many of these being of a physical kind calculated seriously to affect the frame of a subject who has undertaken marital duties at too early a period. No fixed rule can be laid down regarding the proper period for marriage either as regards the man or the woman. It may therefore be said that, not merely for physical but for other reasons, a typical age for marriage might be regarded as 27 or 28 years of age for the man and 23 or 24 years of age for the woman. Probably at the period mentioned there is represented not merely as full a development of body as is necessary and required for the discharge of marital duties, but also the prospect, borne out by statistics, that a union at the ages mentioned is more likely to be fertile than one consummated somewhat later in life. Also we have to take into consideration the fact that in all probability the mental characters and traits of the individuals concerned will have been fixed and formed.

The Wife.—The existence of woman as a wife becomes to a large extent changed from the one she pursued as an unmarried woman. She has taken the first steps along the avenue which leads to motherhood, and she has therefore taken upon herself a certain burden and responsibility in the discharge of the duties attaching to such state. The one condition for successful living here as in other phases of life is the possession of a healthy frame. Certain cautions and recommendations may here be given regarding the way in which a future mother should regulate her life. Allusion has been made to the fact that many women of modern times are indisposed to incur the responsibility of maternity. Unfortunately, in consequence of such resolutions, practices have sprung up having for their object the limitation of offspring, or in other words and put more plainly, the prevention of pregnancy. It is well to warn readers here that such practices are to be carefully distinguished from those which have for their aim the nefarious idea of procuring *abortion*. This last term is applied to such actions or means as are used for the purpose of causing the womb to part with the child at an early stage of its development. If pregnancy

is prevented from occurring by one practice or another on the part either of the husband or wife, such procedure simply serves to prevent conception taking place. When, however, conception has occurred, and the womb contains the fertilised ovum which in a few months will become the fully developed child, no words can be too strong wherewith to condemn any proceedings taken with a view of causing the uterus to part with its contents. The law of every civilised country recognises the injurious nature of such a proceeding. It is one fraught with extreme danger to the woman, and it may be added that many of the substances supposed to be capable of causing abortion are utterly useless for that purpose. If abortion has to be brought on for the purpose of saving the life of a woman who cannot bear a child, such a procedure is carried out by medical men only after deliberate consultation, when all the circumstances of the case are duly weighed and considered. Attempts to empty the womb prematurely undertaken by non-professional persons almost invariably end in death or in the production of serious disease, which may render the woman a cripple and an invalid for years. This is why the law rightly regards the abortionist as a criminal of typical kind. With regard to the prevention of conception it should also be distinctly noted that a vast deal of ill-health amongst women is to be attributed to means used for this purpose. Nature resents very strongly any interference with physiological processes. Hence these remarks should be deeply laid to heart by those who stand in the relationship of husband and wife. Later on in the discussion of this subject directions and advice will be given regarding the care of health in so far as the pregnant woman is concerned. Suffice it here to say that from the moment a woman has conceived, and has therefore taken the first steps on the way to motherhood, she should be made an object of care and solicitude on the part of her family circle. It was a wise practice on the part of the Greeks and Romans of old to regard the pregnant woman as a special object of attention, and our own laws so far recognise that not one but two lives have to be considered, in that it regards, for example, any assault on a pregnant woman as constituting an aggravation of the assault itself.

Child-Bearing.—A subject of extreme importance in so far as regards the health of woman considered as a mother is that which has reference to the number of children she may bear. It is a curious fact that amongst the lower orders the number of births vastly exceeds that as a rule found in the case of well-to-do families. It has been remarked, indeed, that poverty and sterility are strangers, whereas the woman who lives a life of luxurious, indolent ease will be found as a rule to be childless. An old physician expressed the opinion, founded,

as he alleged, upon his own experience, that a change to plain living and increased exercise in the case of a woman accustomed to a luxurious life, was to be regarded as a means of causing her to be fertile. Whether this be true or not, we certainly find that the records of births show us a marked preponderance, among the masses, of large families, whereas in the case of the higher orders of society the family is usually of a much more limited character. It is common to find in the case of the masses births rapidly succeeding one another. There can be little doubt that excessive child-bearing is a fertile cause of disease amongst women. The womb, like every other organ of the body, requires periodical rest from its duties, and the practice already alluded to of women suckling their children for an inordinate period by way of preventing pregnancy shows that the evil of too frequent child-bearing is appreciated even by themselves.

Sterility and Fertility.—The conditions under which one woman appears as “a fruitful vine” whilst her neighbour remains sterile, are frequently difficult to determine. Another section of this work will deal with common causes of sterility, these depending on a variety of circumstances chiefly connected, it may be said, so far as the woman is concerned, with some flexion or bending of the womb, or some other uterine derangement. Many of these cases are capable of being remedied by the physician, who restores the parts to their normal position. In other cases, of course, the sterility may be due to the male, although it may be added that such cases are relatively rare in comparison with those in which the sterility is caused by some displacement of the womb or other cause exhibited by the woman.

The Change of Life.—Assuming that the woman has lived successfully and easily through the period of motherhood and passes beyond middle age, a new epoch dawns in her history. This epoch coincides with the cessation of her functions as a mother. In other words, menstruation, which we have termed the outward and visible sign of reproductive power, ceases. The disappearance of the menstrual period seems to coincide with the cessation of *ovulation*, which has already been described as the discharge of germs or ova from the ovaries. This period of the woman's life is apt to be attended by certain symptoms which render care of her health specially necessary. It is spoken of variously as *change of life*, as the *menopause*, and as the *climacteric period*. We can readily understand how what may be termed a considerable upsetting of the woman's system may be represented at the period in question, seeing that the abrogation of a function which has hitherto dominated her life takes place. In the majority of women, the change of life occurs between forty-five and

forty-eight years of age. In some cases it occurs at an earlier period; in fewer cases it is delayed beyond it. The chief symptoms to be recognised as associated with the period in question are those, first, of general disturbance of the whole system. The last periods will probably be found to be of irregular nature in respect of their occurrence. In certain individuals menstruation becomes at these times of an exceedingly profuse character. Headache is frequent, with other and more serious forms of nervous and mental depression, leading in some cases even to a certain amount of brain derangement, necessitating care of the patient by a physician accustomed to treat mental disorders. The patient complains of flushings, and these passing spasms of heat may alternate with feelings of chill. The digestion is also apt to be disordered. As a rule, when menstruation ceases, many women tend to develop an additional amount of stoutness, so much so that in some cases where the stoutness is markedly increased, especially in the abdominal region, they may actually suppose that they are pregnant. Later on, the stoutness may disappear, leaving, as a writer remarks, only the buxom appearance of the healthy and mature woman. The treatment of the symptoms thus developed at the change of life should be conducted on general principles. It will readily be understood that we are not here dealing with a case of definite disease, but rather with a general irritability of the whole system affected by the cessation of a very important function in the woman's life. The special symptoms will require treatment by the physician, but if the general rules of healthy living be followed out, great attention being specially paid to the state of the bowels, much of the discomfort will be avoided. At this period also it is necessary that the woman should be freed from all worry and unnecessary excitement. Change of air and scene will also accomplish much good, and the sympathy of her husband and her children forms an element of the treatment which is by no means to be overlooked. Digestive disturbances should be treated on ordinary common-sense principles, these including careful supervision of the diet, which should be of a plain character.

A Warning about Alcohol.—There is one very important subject connected not merely with the woman's life in her earlier years but more especially with her existence and health at the climacteric period. It is no uncommon thing for women at large to suppose that where menstruation is painful, it is necessary by way of relief to resort to *the taking of alcohol*. There can be little doubt that many cases of alcoholism or drunkenness in women arise from their habit of taking ardent spirits in the shape of whisky or gin under the idea that such substances will tend to relieve the spasm

and pain of menstruation. The folly of this idea can be readily understood if we have regard to the fact that painful menstruation, as a rule, is due to conditions connected with the womb, such as drugs are incapable of relieving. In any instance, it is of importance to know that when, as is too frequently the case, women suffering from menstrual pain, and especially at the change of life, fly to alcohol as a remedy, they are taking the first step which may lead them into the dread domain of inebriety. The late Dr. Lawson Tait, in a passage of great power in one of his works deals forcibly with this evil. He says: "But perhaps the most common, and I really think the most terrible form of mental disease which is developed at the climacteric period, is a tendency to the abuse of alcohol. Here let me say, in the defence of women, and in opposition to much clap-trap which it has been of late the fashion to write about their drinking, that after a considerable experience of women who have given themselves up to the habit of intemperance, I have never yet had one as a patient in whom there was not some strong inducement to the indulgence. Women are always secret drinkers, in this differing greatly from men; for when a woman does give way to intemperance, she knows how much more she has to lose than a man has, and how much more misery she will bring upon others. The cause will generally be found to exist in some physical suffering, or in some mental distress from which she seeks relief, or in a form of climacteric insanity. I have cured many women addicted to alcohol and other narcotics by relieving them of the suffering due to disease of the uterine appendages. I have known many driven to the use of an alcoholic anæsthetic by the neglect or infidelity of their husbands; but by far the larger number of these unfortunates have adopted the habit late in life, as a relief from their climacteric disease. These are cases of insanity, and it would be a wise law which would enable us to place them in seclusion until the time of their trial was over. I do not believe that women ever take to drink from the mere love of it, or from baneful indulgence, as men do."

With regard to the duration of the sexual life of woman, a calculation has been made that, in ordinary civilised races living in temperate climates, the length of this period extends to about thirty-three years. Among the causes which have to be taken also into consideration in connection with the duration of woman's sexual functions, it is generally regarded that marriage, as well as child-bearing and nursing, are conditions which tend to prolong the length of the period of years during which woman menstruates. It may also be said, on the authority of an expert in women's diseases,

that both early and late appearances of the change of life are due most usually to some diseased processes taking place in the womb or its appendages. In such cases it is advisable that a physician should be consulted.

SECTION II

THE ANATOMY AND PHYSIOLOGY OF THE FEMALE GENERATIVE ORGANS

THE reproductive organs of the female are contained within the cavity of the *haunch or pelvis*. Reference has already been made to the difference which exists between the shape and conformation of the male and female pelvis (Figs. 1 and 2), and the reader may be referred for further details on this subject to the section of this work dealing with the general anatomy of the skeleton. Summing up the characteristics of the pelvis in woman, it is found that whilst the bones are of a lighter character, the upper haunch bones, or *ilia* (Fig. 2), are spread out more widely, so as in this way to increase the breadth of the pelvis and give to woman more protuberant hips than are possessed by the man. The general cavity of the pelvis is wider than in the male subject, although its depth is less. Again, the pubic arch forming the front portion of the pelvis is much wider in woman, a circumstance which has undoubted reference to the function of child-bearing. The sockets of the hip-joints are widely separated in woman as compared with man, whilst the *sacrum* (or portion of the spine wedged in between the haunch bones behind) is of broader shape, and exhibits a greater curvature in women than in men.

The female organs of reproduction include the *uterus*, or *womb itself*, in which the child is developed; two *ovaries*, which produce the *ova* or germ-cells; the *Fallopian tubes*, which convey the eggs or ova from the ovaries into the womb; the *vagina*, or passage leading to the womb from the exterior of the body; and, lastly, the *external generative organs*, to be separately considered.

The Pelvis.—Dealing first with the pelvis (fully described in the second volume of this work), it is composed, as we have seen, of the two haunch bones, with the sacrum wedged in between them behind, the *coccyx* or “tail” being attached to the lower end of the sacrum. We find anatomists dividing the pelvis into an upper and lower

portion. The boundary between the two parts is formed by a line which passes round the top of the pubic bones in front, and is continued along the haunch bones to the upper part of the sacrum. To this boundary the name of the *ilio-pectineal line* is given. Taking in the upper part or top of the sacrum, this line may be said to constitute what anatomists call the *brim* or *inlet* of the pelvis. Above this line the pelvis is called the *false pelvis*, the portion below being known as the *true pelvis*. It is in this latter cavity that the special organs connected with the reproductive functions of woman are contained. With reference to the characteristics of the true pelvis, we find, first, that its brim is somewhat heart-shaped. Its boundary is formed by the ilio-pectineal line on each side, and by the upper surface of the sacrum behind. The cavity is the lower part of the true pelvis, which has for its front boundary the *pubis*; for its side boundary the inner surface of the *ischium*, or bone upon which the body rests when seated; whilst its hinder boundary is constituted by the front of the sacrum. The outlet of the pelvis is of a somewhat diamond shape. Behind the tip of the coccyx constitutes its boundary, whilst in front the lower part of the junction of the pubic bones may be said to constitute its forward limit. With regard to the dimensions of the cavity of the true pelvis, the front is somewhat short as compared with the back wall, this latter being of longer character and exhibiting a forward curve. The outlet of the pelvis is bounded or closed by muscles, this portion forming what is called the "floor" of the pelvis. When this floor is anatomically inspected we find that opening into it is the *vagina* (or canal leading from the exterior of the body to the womb) and the opening of the bowel or *anus*. The space between the two openings is called the *perineum*. This last is a somewhat important structure, for in the case of a first labour it is frequently ruptured.

The importance of studying the pelvis in connection with the practice of midwifery is extremely obvious, seeing that when deformities of this portion of the body exist, as is frequently the case in rickety subjects, the physician has to consider the grave question whether a patient so afflicted is capable of bearing a living child. Technically, the pelvis is mapped out by certain diameters or measurements, so that when the diameters of this part of the body fall below a certain normal amount, the attention of the doctor is directed to the question just referred to, that of the possibility of labour being capable of normal performance. It is occasionally noted that in certain women the pelvis appears to approach more nearly towards the characteristics of this part in the male. In such a case the female pelvis is named "funnel-shaped." Child-bearing in the case of a woman possessing a pelvis of the conformation just

mentioned is apt to exhibit the complications seen in what is called "difficult labour."

External Organs.—With respect to the soft parts included in the list of the female reproductive organs, we first of all find those that are known as the *external organs of generation*. These collectively are often spoken of as the *vulva* or *pudenda*. Above, the external organs of the female exhibit a mass of fat and fibrous tissue covering the pubic bones. This protuberance, covered with hair, is named the *Mons Veneris*. To it, internally, are attached the ends of two important ligaments of the womb known as the *round ligaments*. Passing down from the Mons Veneris, on each side and forming the outer boundaries of the external generative organs, we find two folds of skin, the outer surface of which is covered with hair. These are known as the two larger *lips*, or *labia majora*. These structures contain a certain amount of fat and other tissues. They may be said to form the outer boundary of the vulva or pudenda itself. Above, the junction of these two lips is known as the *anterior commissure*, whilst their union below is named the *posterior commissure*. Lying immediately within these commissures we find a small fold known as the *fourchette*, whilst on the inner side of the fourchette is a small depression or hollow named the *fossa navicularis*. After the birth of the first child, with the rupture of the fourchette, the *fossa navicularis* disappears. The *perineum*, sometimes also called the *perineal body*, lies behind and below the posterior commissure. Immediately within the greater lips are found two folds of skin of similar character and known as the *labia minora*, *nymphæ*, or *lesser lips*. In front or above they join together, in which situation the lesser lips form two processes which constitute the top of a small organ named the *clitoris*. The fold thus formed by the lesser lips is often known as the *prepuce* of the clitoris. Below, the lesser lips simply unite with the sides of the vaginal canal.

Relations of the Parts.—It should here be noted that all the parts represented in the generative organs of the one sex may be said to have their representative in the parts of the other sex. Thus the testicles of the male correspond with the ovaries of the female, while the uterus or womb is represented in man by a small pocket-like depression in the *urethra* or canal leading from the bladder, this depression being called the *sinus pocularis*. In the same way the *clitoris* of the female represents the *penis* of the male. This body is attached to the pubic arch by two processes. It also exhibits certain other structures closely resembling certain of those found in the male organ, including its terminal portion, called the

glans, which is of a highly sensitive character. Lying immediately below the clitoris, and having for its boundaries the lesser lips, we find a triangular space called the *vestibule*. Behind this we find the opening of the vagina. The vestibule is covered by mucous membrane, and in its centre we find the opening of the *urethra* (Fig. 3, *Ur*), lying about an inch below the clitoris and called the *meatus urinarius*. Through the urethra the urine is discharged from the bladder (*V*).

The Bladder.—The exact situation of the bladder opening in woman is seen to be a matter of some importance when we have regard to the fact that it is extremely necessary for the doctor or the

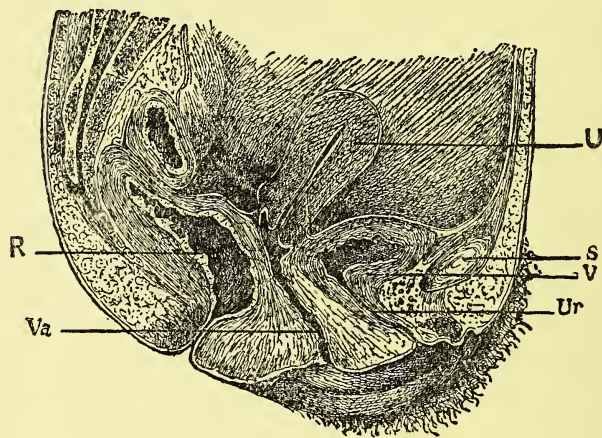


FIG. 3.—Section of Vagina, Uterus, &c.

U, Uterus ; S, Pubis ; *Ur*, Ureter ; R, Rectum ; Va, Vagina ; V, Bladder.

nurse to use a catheter by way of emptying the bladder of its contents. This simple operation should be accomplished without any exposure of the patient. The direction for finding the exact opening into which the catheter (which should be one made of glass or metal, so that it can be easily cleansed and sterilised) is placed, is given in the shape of advising the nurse that the tip of the forefinger should be introduced into the vagina and then pulled forward. The opening of the bladder then presents the feeling of a ring with a raised margin, and the catheter is passed along the finger to this aperture. The operation of passing the catheter is much more easily accomplished in woman than in man. Behind and below the vestibule already described we find the opening of the *vagina* (Fig. 3, *Va*), already described as a canal leading from the exterior of the body to the womb (*U*). The vaginal opening in children

and in young girls for the most part is partially closed, or, indeed, may be wholly closed by a membrane varying in shape, and known as the *hymen*. This is really a fold of mucous membrane. It may vary in shape, sometimes presenting the appearance of a membrane possessing a hole or aperture in its centre, in which case the hymen is termed "circular" in shape. At other times it only partially closes the vaginal opening, and shows a curved outline at its free edge, in which case it is termed "semi-lunar," or "crescentic." The presence of the hymen is generally regarded as a *proof of virginity* on the part of the female. But it must be distinctly understood that the hymen may be but very imperfectly developed, or may be entirely absent in the virgin. It is generally ruptured after marriage, and if it has been unusually developed a considerable amount of bleeding may take place at the first connection. As a rule, when the hymen has been ruptured the remains of it are to be found in small fleshy projections around the vaginal opening, these being called the *carunculæ myrtiformes*. So far from the hymen being an essential proof of virginity, it may be stated that cases have occurred in which this membrane has had to be cut or ruptured to allow of the birth of the child. In cases in which the hymen is entire and complete and exhibits no opening, serious trouble may arise when a girl exhibiting this conformation begins to menstruate, as the menstrual fluid cannot escape. A slight operation has then to be performed in the shape of incising the hymen, and thus permitting of the free discharge of the fluid. Such an operation must be performed under strict antiseptic measures.

The Perineum.—The *perineum* (or *perineal body*) has been already described as forming part of the floor of the pelvis. It lies between the vagina, or entrance to the womb, and the anus, or termination of the bowel, and therefore practically fills the space between these two apertures. In length this portion of the reproductive organs measures about one and a half inches. It is, however, capable of being greatly distended, and in the course of labour stretches extremely so as to permit of the exit of the child. In cases of difficult labour, say, where the child is of more than average weight and size, the perineum, as has already been remarked, is apt to be torn or ruptured. This is an accident which, if attended to immediately after labour, is easily repaired, and leaves no untoward effects.

The Vagina.—The *vagina* has been frequently alluded to in the course of this description as the canal leading from the exterior of the body to the womb (Fig. 3, *Va*). It may be described as a muscular canal, since its walls largely consist of muscular tissue.

Anatomists, however, describe three coatings or coverings in connection with this portion of the generative organs. An outer coat exists composed of a large amount of elastic tissue, whereby the canal is attached to adjacent parts. The middle is the muscular coat. The internal layer, on the other hand, consists of mucous membrane, and when the canal itself is inspected, it is found that the membrane is arranged in cross folds, known as *rugæ*, these folds being connected by a ridge which runs along the front and hinder wall of the canal. At the upper part of the vagina into which the neck of the womb (Fig. 4, *d*) projects, these folds are absent. The vagina is thus seen to be a passage which, lined by mucous membrane, contains the glands proper to such a layer. It is the office of these glands to secrete *mucus* which, as in other parts of the body, presents itself as a somewhat thickened and oily fluid. This secretion, more especially in the act of child-bearing, serves to lubricate the passage, and so to favour the easy exit of the child. With regard to its direction the vagina may be said, in the case of the majority of women, to run upwards and backwards. In consequence of this curvature the hinder wall of the canal is longer than its front wall. At the entrance to the vagina are found two glands named the *glands of Bartholini*, *Duvernay's glands*, or the *vulvo-vaginal glands*. These glands vary in size. In their largest state they may attain the dimensions of a small almond. Each gland opens close to the entrance of the vagina by a tube or duct. They appear to supply a special form of mucus. These structures are of some importance, because, if from one cause or another the ducts of the glands become clogged or closed, the mucus they secrete collects within them, and gives rise to swellings of a painful nature which require to be evacuated by the aid of the surgeon's knife.

The Uterus or Womb.—The description of the vagina naturally leads us to consider the womb itself, which projects into the upper part of the canal (Fig. 4, *d*). The uterus may be described as a pear-shaped organ, the upper extremity of which is directed upwards and forwards, the lower extremity lying somewhat downwards and backwards. In its natural position the womb will be understood to lie between the bladder above and the rectum (Fig. 3), or terminal part of the bowel below. Having regard to its general conformation we find it to be capable of division into two parts. The first is the *body* (Fig. 5, *C*), otherwise known as the *fundus*. This represents the thickened part of the pear, so to speak. Below, at the narrower part of the womb, we find the *cervix*, or *neck* (*Cl*). From the upper end of the womb on each side a tube is found to be given off. These tubes are named *Fallopian*

tubes (Fig. 4, *b*), or *oviducts*. The function of these tubes is that of grasping the ovaries (*a*), so that through them the ova or germs are conveyed into the uterus itself. In the normal and undisturbed condition of the womb—that is, in a woman who has not borne children—its length averages about three inches, while it shows an average breadth of one and a half inches. Its thickness amounts to about one inch, its weight being somewhat over an ounce. In this state the cavity or hollow of the uterus (Fig. 6, *CC*) may be regarded as measuring about two and a half inches in length. The cavity of the uterus is of somewhat triangular shape (Fig. 4), the upper angles of the triangle marking the place of entrance of the Fallopian tubes (*b*). Below, we find a narrow opening which is sometimes called the *os internum* (Fig. 6, *I*), or inner mouth of the womb. This leads into the cavity of the cervix or neck of the womb (Fig. 6, *CCl*), which has already been shown to project into the vagina (*V*). The opening of the womb into the vagina is called the *os externum*, or outer mouth of the womb.

While the normal womb is of the shape and nature just described, it is of interest to note that sometimes women are born with a double womb. The vagina in such cases is also found to be duplicated (Fig. 7). The interest attaching to such cases arises from the fact that this condition may complicate labour, while it is notable that in certain lower animals (*e.g.* marsupials or kangaroo-like animals) the double womb represents the natural condition of the organ.

An organ such as that described, which has to undergo important changes during pregnancy, is provided with a structure admitting of great distention and enlargement. The walls of the womb (Fig. 6) are extremely thick. They consist of three coats or coverings. The outer of these consists of the *peritoneum* (Fig. 6, *P, P*), which is the membrane forming a general lining to the whole of the abdominal cavity. The middle coat of the womb is an important layer, and is composed of muscular fibres of an *unstriped* character; that is to say, they belong to the category of muscles described in the section of this work dealing with the general anatomy of the body as

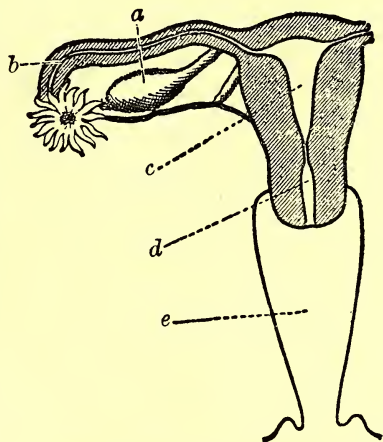


FIG. 4.—Diagram of Womb and Appendages.

a, Ovary; *b*, Fallopian Tube showing frimbriated extremity; *c*, Cavity of Uterus; *d*, Neck; *e*, Vagina.

"involuntary fibres." These fibres form a series of layers, some of which encircle the womb, whilst others run in its long direction; a third set being termed "oblique fibres." The expulsion of the child from the womb is due to the action of these muscular fibres, and it is in this layer chiefly, that the great enlargement of the womb during pregnancy takes place. The inner or third coat of the womb consists of mucous membrane, which appears to be very closely connected with the muscular coat. In the lining membrane of the womb, as in that of the vagina, many glands are contained. These

also enlarge during pregnancy, and show an increase of their functions. The external layer of the lining membrane is covered by *epithelial cells* of the *ciliated* description, such as have been duly described in another part of this work as lining the air passages of the lungs.

In so far as the neck or cervix of the womb is concerned, we find the membrane in this region to be of a somewhat thicker character than that found in the body of the organ. Moreover, it is elevated into ridges which give a somewhat tree-like appearance to this part. Between the folds of the membrane in the neck of the womb are many glands whose function

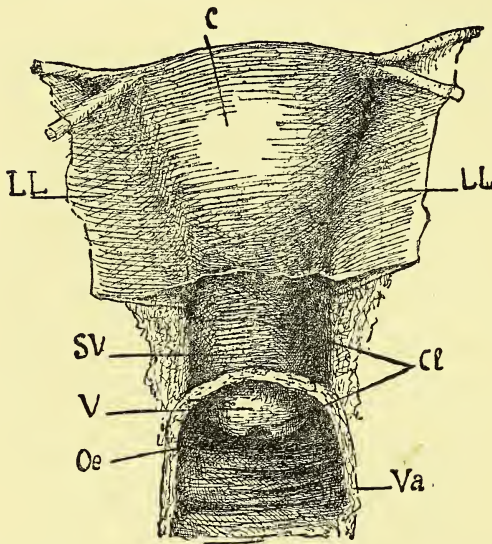


FIG. 5.—The Uterus viewed from the Front.

C, Body of Uterus covered by Peritoneum forming the broad ligaments (LL); Cl, Neck of Uterus; SV, the Neck Portion showing its limits; V, Vaginal Part of Neck showing the external "Os" or Mouth (Oe); Va, Vagina.

appears to be that of secreting mucus of a particularly thick description. This forms a kind of plug, which, in the case of the pregnant woman, closes the mouth of the womb. It is also highly probable that this mucus is of a strongly protective description, and that it prevents the entrance of germs into the womb. It is of interest to note that, with regard to the inner coat of the womb, it is renewed after each menstrual period. Also, when conception has taken place and the embryo child passes into the cavity of the womb, important changes occur in this inner lining. We must also take into account that in so far as the nourishment of the child is concerned the inner coating of the womb plays an important part in the development

of the *placenta*, or "after-birth" (Fig. 10), through which the blood of the mother is conveyed to the child for the purpose of its nourishment. On all of these accounts physicians are justly entitled to regard the lining membrane of the womb as one of the most important structures of the female body. More especially is this opinion held with regard to its liability to absorb deleterious germs which may have gained admittance to the cavity of the uterus.

The Openings of the Womb.—Reverting for a moment to the openings into the womb we may summarise these by reminding ourselves that the first opening to be considered is that of the vagina, which may practically be regarded as being continued through the mouth of the womb into the cavity of that organ. The mouth of the womb in a virgin is represented by a small cross slit, to which the older anatomists, from its resemblance to the mouth of the fish known as the tench, called the *os tincae*. After pregnancy, the external mouth of the womb undergoes natural changes in the direction of enlargement. The second series of openings into the womb are those at its base, of the Fallopian tubes (Fig. 4, *b*) already mentioned. It is through these openings that the germ or ovum which is to form the body of the child passes from the ovaries (Fig. 4, *a*).

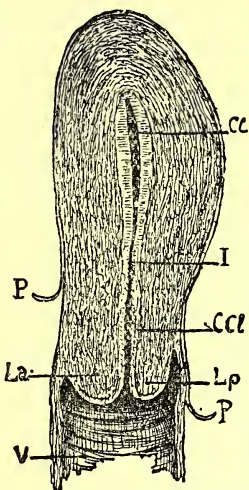


FIG. 6.—Section of Womb of a Woman who has borne Children.

Ligaments of the Womb.—The womb is kept in its place by certain structures known as ligaments. The first of the uterine ligaments to be described are known as *broad ligaments* (Fig. 5, *LL*). These are formed by a double fold of the peritoneum (or lining membrane of the abdominal cavity) already described. Practically they stretch right across the pelvis and have the womb embedded in their substance. The second series of such structures keeping the womb in place are known as the *round ligaments*. Each of these is a cord-like structure. It passes from the womb between the folds of the broad ligament, taking its origin from its own side of the base of the uterus. These ligaments pass downwards towards the pubis, or front of the pelvis; thence they are found to pass through a canal and are attached below to the Mons Veneris and to the larger lips (*labia majora*) of the external organs. Other folds, known as *utero-vesico* ligaments, are found passing to connect the bladder with the uterus, whilst other ligaments again bind the womb to the sacrum. It may

V, Vagina; PP, Peritoneum; La, Front Lip of Neck; Lp, Hinder Lip; CCl, Cavity of Neck; I, Junction of Neck and Body; CC, Cavity of the Body.

here be added that what is known as the *pouch of Douglas* is a space or cavity lying between the back of the womb and the lower portion of the bowel or rectum (Fig. 3). The intimate connection of the bladder and the womb, the former lying above the latter (Fig. 3, V), is of some interest in connection with certain diseases to which women are liable. Thus in certain cases of child-bearing a rupture may occur in the vagina, a communication thus being established between the vagina and the bladder. This result is termed a *vesico-vaginal fistula*, and when this occurs the contents of the bladder, passing through it, are liable to escape by the vagina itself. A simple operation, however, is usually sufficient to cure this condition. This and other conditions will be treated in the section devoted to the "Diseases of Women."

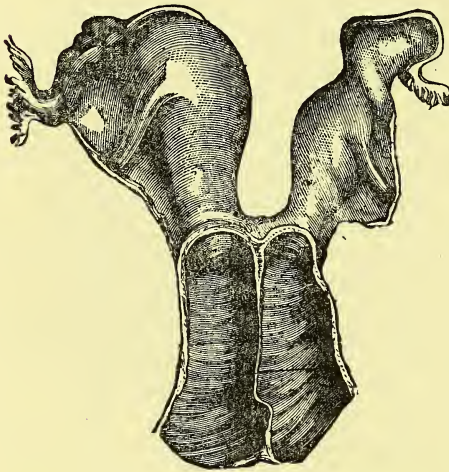


FIG. 7.—Double Womb, showing also Vagina divided in two lengthwise.

In so far as the blood supply of the womb is concerned we find this to be an organ very profusely supplied with the vital fluid. Large arteries supply it with pure blood and large veins convey blood from it. The reason for this very full blood supply can be readily appreciated when we take into account the increased necessity for nutrition, both of the womb and of the child, during pregnancy. The veins of the womb have extremely thin walls, and do not possess the valves found in

most of the other veins of the body. The arteries, which are distributed to the muscular or middle wall of the womb for its nourishment, twist in a remarkable manner, and when the womb enlarges during pregnancy these blood-vessels show a marked increase in their tortuosities. The uterus is also well supplied with nerves which are largely distributed to the muscular wall. The nerve supply, in the opinion of some authorities, is also regarded as being liable to show an increase during the performance of the child-bearing function.

The Fallopian Tubes or Oviducts.—These structures have already been described as two tubes (Fig. 4, *b*) whose duty it is to convey the germ or ovum from the ovary into the womb. They lie in the upper part of the broad ligaments already noted. Their average length is about four inches. They exhibit a somewhat

twisted character, each Fallopian tube ending in an expansion known as the *ampulla*. When the ampulla itself is examined, it is found to be bordered by a series of delicate processes forming a kind of fringe (Fig. 4, *b*). This structure has received the name of the *fimbriated extremity* of the tube. A small opening, called the *abdominal pore*, opens in the middle of the fringed extremity. Through this opening the ovum from the ovary passes into the tube. The function of the fringed end of the tube is that of grasping the surface of the ovary somewhat in a sucker-like fashion, so that the ovum on its escape from the ovary may be readily seized. The name of *tubo-ovarian ligaments* has been applied to one of the fringed processes of the end of the tube. This process is larger than the others, and passes onwards to the outer side of the ovary itself. The structure of the Fallopian tubes is of a highly interesting nature. Like the womb itself, each tube has three layers composed practically of the same structures as those seen in the uterus. A most important fact to be noted regarding the Fallopian tube is that the outer surface of its lining membrane consists of a layer of *ciliated cells*. This layer also passes onwards to the inside of the fringed extremity. The *cilia* of these cells, as in other regions of the body, really consist of minute threads of protoplasm, or living matter which, so long as life exists, are seen to exhibit a constant waving motion. The direction of the movement of the cilia in the Fallopian tube is from the ovary towards the uterus.

We further note that it is due to the action of these microscopic projections that the ovum, seized by the tube from the ovary, is wafted into the womb itself. It is of interest here, however, to note that a failure to comply with this necessary condition for the natural development of the child occasionally occurs. If it be true that conception (which implies the union of the male and female elements) usually occurs, not in the womb itself but in the Fallopian tube, we can see that any failure on the part of the cilia to waft the ovum onwards into the womb will be followed by serious effects in connection with the pregnancy. It thus happens that the child may undergo development, not in the womb but in the tube. This is what is known as *Fallopian pregnancy*, or *extra-uterine pregnancy*. Its occurrence seems to prove that conception occurs in the tube, and not in the womb itself. Such cases are always of a serious nature, and necessitate an operation for the removal of the child. It may here be noted that the fringed termination of the Fallopian tube, possessing an aperture which receives the ovum from the ovary, and by which the tube at its front end is really in connection with the peritoneal cavity, or that of the general lining membrane of the

abdomen. This cavity, therefore, communicating with the tube with the womb, and by the womb with the vagina and with the body's exterior, it is not to be regarded in the female as a closed sac, a condition, this latter, which is represented in the male subject.

The Parovarium.—A curious structure known as the *parovarium*, or *organ of Rosenmüller*, may be here noticed. This organ is situated in the broad ligament of the womb. Two lobes or halves exist, one on each side. It lies between the Fallopian tube and the ovary. Its examination reveals a structure consisting of a number of closed tubes, varying from twelve to twenty in number. These tubes seem to be lined by *epithelial cells*. In lower animals the parovarium would appear to be of greater importance than in woman. It represents the remnant of some structure developed in early life, but whose functions disappear in the adult, the case of this organ being somewhat similar to the *thymus gland* in the neck. The importance of the parovarium in medical practice arises from the fact that it sometimes gives origin to tumours.

The Ovaries.—The ovaries (Fig. 4, *a*) form, along with the uterus, the most important structures included in the list of the female reproductive organs, inasmuch as they are the structures on which devolve the development and ripening of the *eggs* or *ova*, each of which, when fertilised, is capable of developing into a child. The ovaries constitute typical parts of the female reproductive organs in all animals. They differ naturally in form and structure as we advance from lower to higher forms. It has already been noted that they are the representatives of the testicles of the male. Each ovary is situated in the hinder surface of the broad ligament of its own side. It is joined to the womb itself by a fold called the *ovarian ligament*, and it is bound also to the Fallopian tube by another ligament already described. Each ovary is of oval shape, averaging about one and a half inches long, half an inch in thickness, and about three-quarters of an inch in width. In colour the ovary is of whitish hue, and on its surface certain small scars are to be noticed. These are called *corpora lutea*. They mark the situations from which ova, or germs, have escaped from the organ. In respect of its structure the ovary is covered externally by cells of a character approaching to those found in the peritoneum itself. This covering is often known as that of *surface* or *germ epithelium*, and by some anatomists the cells have been described as passing into the body of the ovary, and as being the source of origin of the ova and the vesicles or sacs in which they are contained. Below this outer layer we find a fibrous membrane known as the *tunica albuginea*. The substance of the ovary itself consists of the material known as *white fibrous tissue*,

with a certain proportion of elastic tissue. Both structures appear of a more active and vital kind in the ovary than when they are found in other parts of the body. To the general mass of tissue of which the ovary consists the name of *stroma* has been applied. Embedded in this general tissue we find those important bodies known as *Gräafian follicles*, *ovisacs*, or *ovicapsules*. These are small sacs in which the ova or germs are developed. They are larger towards the centre of the ovary than at its surface. Their average diameter may be set down at the $\frac{1}{50}$ th part of an inch, the largest ranging from the $\frac{1}{5}$ th to the $\frac{1}{20}$ th part of an inch in diameter. Each Gräafian follicle contains, as a rule, one ovum only, but occasionally two germs may be found in one sac. In the young child, which is practically born with its full complement of follicles, it has been estimated that each ovary may contain between thirty and forty thousand ova. When puberty is reached and menstruation begins, a certain number of ova, varying from twelve to thirty or so, can be observed developing in follicles of large size, each containing an ovum on its way to be matured. As has already been described, when the ovum leaves its follicle by the aperture in its sac, and is passed to the surface of the ovary to be seized by the Fallopian tube, a scar is left marking the place of the empty sac. In such a case the follicle itself becomes filled up by a yellowish substance, and is called a *corpus luteum*. Reference has already been made to the existence of these appearances on the ovarian surface. It would appear that in course of time the corpus luteum vanishes away; but it is curious to note that where, as in the case of an unmarried woman, the ovum passes into the uterus and dies, not being impregnated, the corpus luteum quickly disappears. On the other hand, where impregnation has taken place and the germ passes onwards towards its development into the child, the corpus luteum persists for a longer period. The reason for this longer duration in the case of pregnancy has been attributed to the greater amount of blood passing to the reproductive organs, thus maintaining the corpus luteum longer in an active state. The broad view which may thus be taken of the functions of the ovaries is that of regarding them as the producers of ova, which all through the sexual life of the woman are being delivered on the surface of the ovary, and more especially at the time of the menstrual period. It is those ova which are seized by the Fallopian tubes, impregnated, and passed onwards to the uterus that give birth to children. Ova not so impregnated must be regarded as being capable of living in the tube or uterus for a certain period, when, their functions not having been established by impregnation, they die. It is also of some importance to note that the corpus luteum in the case

of pregnancy does not disappear practically until after delivery. As an author remarks, if a woman dies during pregnancy, or soon after delivery, an examination of the ovaries will show from which organ the ovum that was impregnated originated. In the young girl the surfaces of the ovaries are smooth, but in old women they exhibit a somewhat puckered appearance, due to the scars marking the extrusion of the ova, whilst a certain amount of natural shrinking of the organs may take place as age advances.

We can readily understand from the foregoing particulars that each case of single birth will result from the impregnation of one ovum which has been discharged from the ovary. Twin cases or those of triplets—this number being occasionally exceeded in the human subject—are to be similarly accounted for by the fact that from one cause or another more than one ovum escapes from the ovary and undergoes impregnation.

The Breasts.—The *breasts* or *mammæ* may be regarded as organs subsidiary to those of reproduction, in that they are intended to be devoted to the secretion of milk, the natural food of the child. They are two in number in man and his neighbour animals, but may vastly exceed this number in many lower forms. It is not unusual in women occasionally to find what are called supplementary mammary glands. Even in the man, in whom these organs have naturally undergone considerable modification of function, we may also find supplementary breast rudiments. A most intimate connection exists between the generative organs and the breasts of women. Thus, we have already shown that the oncoming of menstruation in the girl is marked frequently by pain or irritation of the *mammæ*. In many ailments of the womb also, and of the ovaries, the breasts will exhibit a certain intimate sympathy with the diseased organ. It is only in the higher class of animals, namely the mammals or quadrupeds of which man is the head, that the young are nourished by the milk secretion, although there are not wanting, even in the case of certain fishes, instances which appear to show the far-back origin of this feature of the maternal functions in the higher races of animals. The breasts vary very much in form in the young woman from that which they assume in the woman who has become a mother. Their normal situation is one on each side of the chest overlying the third, fourth, fifth, and sixth ribs. In the young girl the breasts are not pendulous or dependent. They may, however, even in unmarried women, be subject to considerable enlargement from an excessive development of their fatty materials. During pregnancy they naturally enlarge in order that their function of milk secretion may be duly carried out. The *nipple* or *teat* rises from the centre of the breast. With regard

to the structure of each "mamma," we find that it is divided into a number of lobes, separated by fatty intervals. Each lobe really consists of somewhat rounded sacs or vesicles from which arise slender ducts or tubes. The tubes of the various lobules unite together, thus forming ducts of larger size, so that the smaller ducts at last are found ending in the nipple in the shape of from fifteen to twenty larger sized tubes, these tubes opening on the surface of the teat, each by its own orifice. Before the ducts reach the nipple they are found to expand somewhat, and in these expansions the milk secreted by the breasts tends to accumulate.

It is a curious fact that the mammary glands practically correspond in their nature to those glands described in the section of this work dealing with the skin structure, and known as *sebaceous glands*. These latter supply to the skin surface, and also to the hairs, an oily fluid. In the course of evolution we thus see that nature has simply modified so many of these skin glands into the breasts, providing them with a new function, namely, that of the secretion of milk. Cases are known to medical men in which the male breasts have occasionally become active in function when they become enlarged and have secreted milk. It is also notable that even in young women at the time of puberty the breasts may undergo a certain amount of enlargement, and may secrete a thin fluid. Such facts would appear to strengthen the idea already alluded to in discussing the origin of sex, namely, that of the derivation of both sexes from a common type. In some nations the breasts may be extremely large and dependent or pendulous, this being a natural feature of the women belonging to the peoples in question. Thus in certain African races the breasts are so large that they can actually be thrown over the shoulder, so that the infant can be suckled from behind.

Another proof of the sympathy which exists between the breasts and the reproductive organs of the female is found in the fact that it is a practice of certain surgeons to-day to operate upon the generative organs under the idea that cancer of the breast may be relieved or cured. It is not intended, however, by this statement to convey the idea that such a mode of procedure is universally successful.

The Ovum.—The *ovum* or *germ* from which the body of the child has been shown to arise has already been described as a cell—that is to say, it is a *living body* composed of living material. It averages in diameter the $\frac{1}{120}$ th part of an inch. In the section of this work devoted to the consideration of the cell elements of the body it has been pointed out that these microscopic atoms represent the workmen of the living frame. They discharge all the functions incidental to life, from governing our movements as in the case of

brain cells, to secreting bile as in the case of the cells of the liver. The ovum may therefore be regarded as a special cell set apart in all animals (and in plants also) for the reproduction of the race. It is necessary in the vast majority of cases for the introduction of the changes which result in the development of a new body that the ovum should be *impregnated* or *fertilised*. By these latter terms are meant *the union of the male element with the female ovum*. A similar process occurs in plants, since it is necessary that the *pollen* or "fertilising dust" of the flower, produced in its stamens, should be brought in contact with the *ovule* developed in the ovary which forms part of the pistil of the flower. In certain insects it is known that new individuals may be produced from the ovary of the female without apparent impregnation by the male. This is known to scientists under the name of *parthenogenesis*. Thus male bees are developed from eggs which are not fertilised, and in the case of the aphides, or plant lice, numerous generations are produced from females to which males have had no access. In such cases naturalists assume that this process of producing young is rather to be regarded as one of "budding" than of true reproduction. We are familiar with the budding process in many of the lower forms of animal life, and it may be that even in the case of animals so high in the scale as insects the same action may be capable of evolving new individuals.

Conception.—Impregnation then, in the case of the human female, consists in the contact of the male fluid with the ovum. This action may take place in the womb itself when the ovum has there arrived, or as we have seen, the male fluid may pass upwards to meet the ovum in the Fallopian tube. Suffice it to say that when the contact in question has taken place, the ovum is immediately sent forth on its developmental history, which in all natural cases is carried out in the cavity of the womb itself. It has generally been argued, and with great reason, that conception is more liable to occur just before or just after a menstrual period. In this view the middle term between the end of one period and the beginning of the next has been generally assumed to be that in which the woman is least liable to conceive. It must be duly noted, however, that many, and great, variations exist in this respect. Conception has occurred when menstruation has been completely absent, and cases are recorded in which women have fallen pregnant after menstruation has entirely ceased.

After-Changes.—The changes which ensue after impregnation are many and important. One of the first alterations to occur is a thickening of the lining membrane of the womb, this being thrown into folds. It is highly probable that when the ovum passes into

the womb it is caught and fixed in one of the folds of the lining membrane. We may describe it, in fact, as anchoring itself in this fashion, and the site of the anchorage will determine the exact part of the womb in which the early development of the child will take place. It is of some importance to know that in the majority of cases the ovum settles down towards the *fundus* or *base* of the uterus. Most frequently the front wall is that selected as the site for development. In other cases the anchorage may take place towards the mouth of the womb. At the position of attachment of the ovum the *placenta*, or *after-birth* will be developed. If, therefore, the child be practically fixed to the front position of the womb and towards the mouth of the organ, the development of the after-birth in this situation creates a very serious complication of labour. Such a case would be named one of *placenta prævia*, one of the most troublesome and dangerous conditions with which the midwifery practitioner has to deal.

We speak of the structure which develops in the lining membrane of the womb as the *decidua*. Three layers are recognised in the modified membrane of the uterus. The *decidua vera* is the name given to the general lining of the womb, but the part to which the ovum has anchored itself is termed the *decidua serotina*. It is here that the after-birth is developed. The third layer is known as the *decidua reflexa*. This is practically formed by the growth of a special layer of cells which is developed in the ovary. The decidua reflexa covers the developing germ, and as the ovum increases in size the decidua reflexa unites with the decidua vera or general layer. About the end of the third month of development the child will be found to fill the cavity of the uterus. Before this period a space exists, and from this latter will come blood in a case in which menstruation occurs during pregnancy. The child is generally spoken of as an *embryo* (Fig. 8, *E*) during the first three months of its existence. From the third month until birth it is termed the *fœtus*. The development of the child later on includes the formation of two coverings, in which it is enclosed. The outer of these is called the *chorion* (Fig. 8, *CH*). This membrane appears to develop about the third week of existence. On its outer surface it shows a growth of small projections named *villi*. These, like little roots, pass into the membranes surrounding the child, namely, the *vera* and *reflexa*. It is in this way that the child is really anchored to the side of the womb. There is little doubt that these villi contain blood-vessels, and must contribute to the nourishment of the embryo. When the second month of development is finished those projections which dip into the decidua serotina layer show a very marked development through which they

contribute largely to the formation of the after-birth. The inner layer enveloping the child is known as the *amnion* (Fig. 8, *A*). A certain amount of fluid may be found between the two layers. The amnion covers the outside surface of the placenta, or that next the child, and if it be traced onwards it will be found to merge into the outer covering of the *umbilical cord* or *navel string* (Figs. 9 and 8, *C*), through which blood is conveyed from the womb into the body of the child. The child itself floats in a fluid known as *liquor amnii*. There is no doubt that the source of this fluid is the

blood of the mother, filtered through to provide the child with a kind of water-bed. The sac containing the liquor amnii is often spoken of as the "bag of waters." The fluid escapes when labour commences, and to a certain extent acts as a lubricant of the passage through which the child makes its exit into the world. The liquor amnii may either be present in too small a quantity or to an excessive extent. These latter cases demand the special attention of the physician.

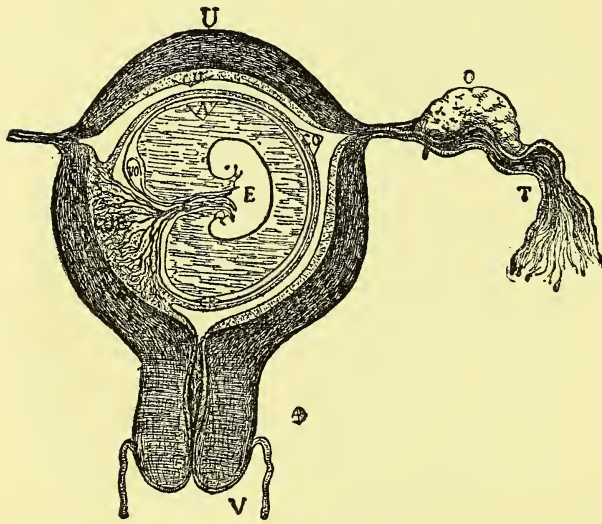


FIG. 8.—The Womb and contained Embryo at about the second month.

O, Ovary; T, End of Fallopian Tube; V, Vagina; U, Section of Fundus or Base of Womb; CU, Uterine Layer of Decidua; CO, Embryonic Layer; CUP, Utero-Placental Layer; E, Embryo; CH, Chorion; A, Amnion; VO, Umbilical Vesicle; C, Cord.

The Placenta.—We

have already stated that the *placenta* or *after-*

birth (Figs. 10 and 8, *CUP*) develops during the third month of pregnancy. In its normal development it is a somewhat oval, flattened, and cake-like structure, one side of which, next the womb, is known as the *maternal part*, and the other as the *fetal part* (Fig. 10). It contains large spaces or *sinuses*, in which the blood of the mother is received. From each sinus the pure blood brought by the artery is carried away impure by a vein. The little villi, or processes of the chorion, already described as resembling roots, dip into the sinuses, and the blood of the mother passes through the projections, or rather transudes through them, and thus reaches the child. It will thus be seen that there is no direct transmission of the blood of the

mother to the foetus. It is rather represented by an interchange of fluids between the two. The child receives from the mother's blood through these processes all that is necessary in the way of its nutrition, whilst it gives forth in turn to the maternal system the waste matters incidental to the work of development. The *placenta* or *after-birth* has been aptly compared in this case not merely to the stomach of the foetus nourishing it, but likewise to a lung which supplies it with the necessary oxygen, and receives carbonic acid gas and other waste products. The average size of the after-birth is about seven inches in diameter. Its thickness is about one and a half inches, and its weight about one and a half pounds. After the birth of the child the after-birth is expelled along with the membrane in which the child has been enclosed, this process resulting from the after-contractions of the womb. A very important part of the nurse's duties in connection with the care of the woman in childbirth is that of seeing that the *whole* of the after-birth is duly expelled. Serious results accrue when portions of the after-birth from one cause or another are left attached to the lining membrane of the uterus.

The Umbilical Cord.—The *umbilical cord* or *navel string* (Fig. 9), as it is popularly called, is the means of communication between the system of the mother and that of the child. It generally arises from the centre of the after-birth (Fig. 10), but it may be attached to its edge. The length of this cord ranges from six inches to, it may be, three or four feet. It exhibits a spiral structure, and contains arteries and a vein from which the blood of the foetus is conveyed respectively from and to the placenta. As a rule the umbilical cord depends freely and floats in the *liquor amnii*, but it may be found in some cases twisted round the neck of the foetus. Constrictions or knots are also apt to be formed in the cord, in which case serious results may happen which materially interfere with the nutrition of the child.

Circulation in the Foetus.—In connection with the nutrition of the unborn child, it is interesting to note that its circulation differs in certain important respects from that represented in the adult. A reference to the section of this work dealing with the circulation of the blood will show that in the full-grown person the two sides of the heart, right and left, are completely separated one from another. The left side is occupied in sending pure blood outwards to nourish



FIG. 9.—The Umbilical Cord.
A A, Arteries;
V, Vein.

the body. The right side, on the contrary, receives the impure blood returning from the body and pumps it into the lungs, from which, after purification, it is once more returned to the heart's left side for re-circulation through the body. In this way no mixture in the heart is possible of the impure blood from the body and the pure blood coming from the lungs. In the unborn child the lungs are, of course, placed out of consideration as purifiers of the vital fluid, and we therefore find in the child, before birth, a certain modification of the heart's structure. Thus, a great part of the unborn child's blood goes directly from the right to the left side of the heart through an opening

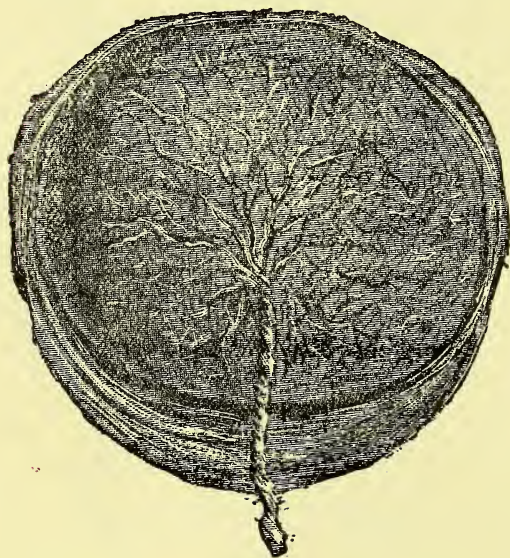


FIG. 10.—The Placenta or After-birth (foetal side).

called the *foramen ovale*, which, under ordinary circumstances, closes soon after birth. Also it is to be noted that the blood which passes from the right to the left side of the heart is really made to pass by a short tube (*ductus arteriosus*) connecting the blood-vessel going to the lungs with that which leaves the left side of the heart. Again, in the adult we find that very much of the impure blood passes from the liver on its way to the heart's right side. In the unborn child the bulk of the blood is sent directly to the heart, and does not pass into the liver at all.

The vessel concerned in this function is called the *ductus venosus*. It follows, therefore, that the blood passing from the right to the left side of the heart of the child circulates through its body. When its duty of nourishment has been discharged in the foetus it passes to the placenta, being conveyed through the arteries of the navel string (*umbilical arteries*). In the after-birth these vessels subdivide, ending at last in the villi, or projections, in collections of minute blood-vessels or *capillaries*. In the villi it would appear that the blood is purified, and it is next conveyed through another set of fine blood-vessels, which increase in size, and ultimately end in the umbilical vein or that of the cord, which in its turn conveys the purified blood back into the body of the child. From this vein the blood is carried through the child's liver

to the right side of the heart. After circulating through the body of the foetus, it is again returned to the after-birth to undergo the process of purification, fitting it for the due development of the child.

In this way we see distinctly that the child possesses a circulation of its own, and that its connection with that of the mother is largely one of mere food supply, the actual purification of the blood being effected in the after-birth. At birth the circulation practically becomes that of the adult, since the child begins to use its lungs for the purpose of breathing. The vessels and communications peculiar to the foetal state then disappear. If it so happens that any one of its communications does not close naturally, we find the circulation of the child to be seriously interfered with. The blood being imperfectly purified causes what is called a *cyanotic condition*. This produces a bluish tint of the skin, which is extremely characteristic. Such cases are not always fatal, but a child possessing the defect in question is apt to grow up delicate, and in many cases the defect must be regarded as one tending to shorten life.

It may be noted that the birth of the child practically occurs at what, in the case of the unimpregnated woman, would have been a menstrual period. An author has expressed the relation between menstruation and pregnancy in popular but at the same time graphic fashion by stating that every menstrual period represents a "pregnancy in miniature," whilst the period of confinement represents a menstrual period which has fully realised its purport.

The Development of the Body.—When an ovum has been impregnated in man or any other animal, certain definite changes are seen to occur in its structure. We must remember that the ovum itself represents a single living cell. As a result of its fertilisation, there is first said to be a course of development known as *segmentation*. This process may also be termed one of "cell-division," seeing that the ovum or single cell divides first into two cells, each of which in turn dividing give rise to four cells, this action proceeding until at its termination the original single germ or cell is represented by a mass of small cells. It is interesting to note that the eggs or germs of all animals follow a similar course of development up to the stage when cell-division has arrived at its conclusion, this stage being called the *morula* or *mulberry stage*. The next step seen in the development of the child's body is the separation of the cells thus formed into three layers. The outer is known as the *epiblast*, the middle as the *mesoblast*, and the inner layer as the *hypoblast*. The division of the original germ into many cells may be regarded as the first stage in the work of preparation for the building of the future body. The cells produced by the division of the germ may really be compared to

the bricks of which the future house is to be built. Indeed, from the three layers just noted into which these cells divide and separate, the whole structures of the future body are formed. It is of importance to note the share which each layer takes in the production of the body of the child. Thus, the outer layer or *epiblast*, curiously enough, gives origin to two structures of widely varying importance. It forms the outer skin, and from the portion of the epiblast, which is turned inwards in development, we find the nervous system formed. The great bulk of the body is really formed from the middle layer or *mesoblast*. Thus, the skeleton, muscles, and other organs originate from this layer. The *hypoblast*, or innermost layer, takes little share in the formation of the body in respect of its bulk, but nevertheless is responsible for the formation of structures of great importance in the frame. Practically, this innermost layer forms the lining membrane of the digestive system, whilst from it are also developed the lining membranes of the lungs, of the bladder, urethra, and of other parts. The study of the further development of the body, it will be understood, is a highly technical matter, and does not really concern the special objects of this work. Enough, however, has been said to indicate the general manner in which, from the stage of the unimpregnated ovum or egg onwards to the laying of the foundations of the future body of the child, nature, in her own marvellous manner, evolves and develops the living frame.

THE SIGNS OF PREGNANCY

It is a matter of the highest importance that we should familiarise ourselves at this stage of our studies with the symptoms or indications through the observation of which we may assure ourselves that pregnancy has occurred. The more necessary is it that such signs should be duly studied, because of the liability to mistake in this matter which is represented in cases say of so-called "false pregnancy." In other words, we have to consider the circumstances under which mistakes may arise through the presence of symptoms which may more or less closely imitate those of true pregnancy, whilst at the same time the uterus, or womb, is unoccupied by a developing embryo. Authors dealing with this subject have been accustomed to divide the signs and symptoms of pregnancy into two classes. The first class includes those symptoms of which the woman herself is conscious. They constitute, so to speak, the personal record of feelings and sensations which she herself experiences, and the construing of them is dependent naturally upon the account given of

them by the patient herself. Such symptoms are known as *subjective* ones. The second class of indications that pregnancy has occurred includes those which we may term *objective signs*. Here we come upon a series of symptoms which can be observed by the nurse or physician, and for the true reading of which the relation of the patient's own experience is not required.

Subjective Signs.—If we take, first of all, those symptoms which have been described as of personal nature and are experienced by the pregnant woman herself; and furthermore, if we record them in the order of their recurrence, we shall find that the first sign which the woman herself usually notices as an indication that pregnancy has taken place is represented by *cessation of menstruation*. It has already been explained, that during the whole period of normal pregnancy the menstrual flow ceases, as it also disappears during suckling. At the same time it is most necessary to impress upon the reader that, taken by itself, this symptom is not to be regarded as of a conclusive nature. Menstruation in a married woman may cease for a time from causes entirely unconnected with conception. Cold, disease of the womb, or even mental strain, might thus delay the appearance of menstruation at its natural and expected time. In the same way irregular menstruation common at “the change of life” might very naturally cause a woman to regard herself as possibly pregnant. Again, it is to be borne in mind that even after conception has taken place—and although menstruation as a rule then ceases, a woman may still exhibit her monthly periods, if not throughout pregnancy, at least for two or three periods after conception has occurred. The only rational mode of dealing with this symptom as an indication of pregnancy is that of assuming the case of a healthy married woman. Supposing that her domestic life has rendered her liable to conceive, then, in the absence of any bodily condition which might account for the stopping of her monthly periods, we might feel entitled to assume that if she passes her usual time for being unwell the chances are that conception has taken place.

Morning Sickness.—No one sign of pregnancy, let us remind ourselves, taken by itself, can be relied upon to indicate with certainty that conception has occurred. Suppose, however, that in addition to the cessation of menstruation the woman begins to suffer from what has been termed “morning sickness,” the combination of the two symptoms will tend to render the reading of the case in its true light of a much more certain character. The sickness of pregnancy may occur very soon after conception. In many cases it does not appear until the first menstrual period has been missed. This symptom is very variable in its duration; as a rule it lasts during the first half

of the pregnancy, that is to say, for about four and a half months. In other cases it may persist throughout the whole term of the development of the child, whilst in a third class of cases, whilst the patient is free from morning sickness in the earlier months, she may be troubled with it in the later period of her pregnancy. This symptom derives its name from the fact of its appearing when rising from bed in a morning, although at times it may be present during the day. It may also vary in its extent from a feeling of mere sickness or nausea to actual vomiting, when the contents of the stomach are rejected. The cause of morning sickness has been referred by physicians to some influence or other exerted by the developing womb on the nervous system; whilst it has been spoken of as a "reflex action" such as has been described in the section dealing with the nervous system. The importance of "morning sickness" is added to when it is found to cause great disturbance of the system, and it is then that medical intervention may be required. To this subject further attention will be directed in the section dealing with the "Diseases of Pregnancy."

Other Symptoms.—Other symptoms indicating that a woman has become pregnant are those which refer to the condition of the mouth and the bladder. Thus it is no unknown thing for a woman to complain when in this condition—*salivation*, that is—of an excessive development of the saliva, or "water" of the mouth. Also, with reference to the *bladder*, many women exhibit a desire or necessity to empty the bladder very frequently. This latter symptom is more common in the earlier than in the later months, and is attributable to the pressure of the developing womb on the bladder itself. Allusion has already been made to the sympathy which exists between the *breasts* and the womb. It is not, therefore, surprising to find that in the pregnant woman the breasts should share in the functional disturbance of the system. Many women complain of *pain in the breasts* after conception, and according to the opinion of some authorities the pain is most frequently limited to the *left breast*. Later on we shall see that, as regards the breasts, important signs of pregnancy are afforded by certain changes which can be duly seen and noted.

Quickening.—This symptom may be regarded as of all those experienced by the woman the most significant of pregnancy. Taken especially in conjunction with the symptoms just detailed, the sensation of quickening, if duly appreciated and experienced, is practically conclusive that the woman is "in the family way." In common language the sensation of quickening is often called that of "feeling life," or "stirrage." This symptom is due to the movement of the

foetus in the womb. Importance is attached to the period at which quickening occurs. This period may be set down, as a rule, as occurring in the sixteenth week or end of the fourth month of pregnancy. Very frequently the first movement of quickening causes a sensation of faintness in the woman. She describes her sensation as that of a kind of twitching or fluttering movement of the womb. These movements increase in intensity with the growth of the child, and may in some cases be of a very decided nature. The movements themselves at a later stage of pregnancy are capable of being felt if the hand be pressed over the womb. Many nurses calculate the date when the confinement will take place from the occurrence of the quickening. At the same time it is to be noted that these sensations *may be imitated* in women who are not pregnant, but who have reason to suppose that they are in this condition. Thus the accident of a tumour in the womb may occasionally give rise to sensations of the kind described; whilst if the bowels be distended with gases, the result of indigestion, a very fair imitation of the movements of "quickening" may occasionally be found.

Objective Symptoms.—These we have seen to include the signs of pregnancy which can be seen or otherwise ascertained. In the first place, as might naturally be expected, *the abdomen or belly shows signs of enlargement*. This increase generally occurs after the third month, but in some women, and especially in those who have before been mothers, the abdomen may enlarge shortly after conception has occurred. It has been noted that in many women the belly may become flatter in the early part of a first pregnancy than before conception occurred. This symptom arises from the fact that the womb sinks in the earlier months and begins to rise after the third month. Naturally the amount of swelling of the abdomen will depend on the particular bodily build of the patient and upon the nature of the pregnancy. Thus a twin pregnancy will naturally cause a greater enlargement than where a single child is being developed, whilst if a large amount of the fluid known as the *liquor amnii* is contained in the womb, the abdominal swelling may be expected to be of an increased character. As a result of the stretching of the skin of the abdomen, due to the enlargement of the womb, streaks resembling in their way slight scars appear on its surface. One of the evidences, indeed, that a woman has borne a child is found in the presence of these streaks. It is to be remembered at the same time that diseases such as dropsy, or the presence of a tumour, may also produce them. Physicians also note that the skin of the belly tends in pregnancy to assume *a darker hue* than is normal, and it has been noted that pregnancy is also associated in

many cases with *the development of a dark line running down the middle of the belly*, beginning at the end of the breastbone and extending to the Mons Veneris. *Projection of the navel* (or *umbilicus*) is also regarded as a sign of pregnancy, especially in the later months.

Breast Symptoms.—The breast symptoms which are visible to the observer are not distinctly marked until the third month of pregnancy. An increase of size takes place and the *superficial veins* of the mammæ become more prominent. The *nipple* also shows a darkening of its natural colour. Around the nipple the skin surface (known as the *areola*) *also becomes darker* and tends somewhat to spread in extent. The colour of this areola differs in different women. As a rule, however, taking the natural complexion of the patient as a guide, it always becomes darker. If the breasts at this or a later stage are compressed *milk* can be expressed from them, and, as in the case of the abdomen, the enlargement of the breasts results in the production of streaks in the skin covering them. It may be remarked that many physicians attach great importance to *the darkening of the areola*, and it is regarded as being much likely to be a sign of value when a woman has become pregnant for the first time than in the case of later pregnancies.

The Abdomen.—After the fourth month of pregnancy when, as has been described, the womb rises in the pelvis, it can be distinctly felt as an enlarged mass. If the patient be made to lie on her back, the knees being drawn up so as to relax the muscles of the abdomen, and the warmed hand be placed upon the belly, firm pressure being exerted upon it, the womb may be felt. The success of this procedure depends upon the patient keeping the muscles of the belly in a relaxed state. Also at any period after the sixth month of pregnancy if this procedure be carried out and the hand be pressed over the womb and kept in that situation for a certain time, physicians describe the sensation experienced by the hand as that of feeling a somewhat hardened mass followed by the sensation of relaxation or softening. This alternation of hardening and softening of the abdominal swelling is regarded by many as peculiarly distinctive of pregnancy and as a sign which is not present in the case of, say, a tumour.

“Ballottement.”—This sign of pregnancy is one which has long had a high reputation in the French school of medicine. It can only be practised, of course, by a physician. The patient is placed in a half-sitting or nearly upright posture. If the forefinger and middle finger be passed into the vagina and used to push up the womb, that organ naturally rises, with the effect of causing the child to float upwards in its liquid. The fingers being kept in the same position

experience the sensation of the falling of the womb upon their tips. This sign can only be ascertained between the fourth or fifth and seventh months.

The Uterine Sounds.—The physician is enabled to gain valuable information regarding the course of pregnancy from using the *stethoscope* (see vol. i.) by way of ascertaining the existence of certain sounds which may be heard in the womb. What is known as the *womb souffle* or *bruit* can be heard after the fourth month is passed. This sound is caused by the flow of blood in the arteries of the womb, but as it may be found also in cases of disease of the womb it is not to be regarded as thoroughly diagnostic of the existence of the pregnant state. Absolutely distinctive, on the other hand, are the *sounds of the heart of the unborn child*. These sounds are present after the fourth month. The sound is feeble and requires careful observation in order to detect it. The rate at which the sounds proceed varies from 120 to 130 in the minute. Physicians in ascertaining the existence of the sounds of the foetal heart generally place their finger on the pulse of the mother so that the difference between the rate of the maternal pulse and of the foetal heart may be duly compared. The stethoscope is generally applied at one side of the navel. If not heard on the one side it is necessary to test the other, as the possibility of detecting the sounds naturally depends on the particular position which the child occupies in the womb. In the natural position in which the child is developed—head downwards—the beat of its heart will be heard as described at one or other side of the navel, but it may be necessary in cases where the position of the child varies from that which is natural, to examine above the navel or below it. Finally there is another sound found in pregnancy due to the rushing of the blood of the child through the blood-vessels of the umbilical cord or navel string. This latter sign requires greater skill in its detection than that required for the determination of the sounds of the child's heart.

In considering the signs of pregnancy it is very needful again to point out that a certain proportion of the symptoms described may be imitated by disease, such as the development or presence of tumours of the womb and other parts, or by dropsy and allied troubles. Very serious and grievous consequences have sometimes arisen in the case of unmarried women who, from the presence of such diseases remaining undetected, have been suspected of being pregnant. Nothing more disastrous to the fair fame of an unmarried woman can possibly occur than to be suspected of being pregnant simply because a certain number of the signs of pregnancy are represented in her case. It is well to bear in mind the caution that the

existence of the pregnant state in such an instance is not to be lightly estimated. It must be diagnosed from the observation, not of a few, but of all the symptoms which have just been described.

The Duration of Pregnancy.—The normal and natural duration of pregnancy becomes naturally a subject of much importance, because it bears an intimate relation to the period at which the confinement may be expected. A normal pregnancy lasts, as a rule, for 280 days, but great variations occasionally are found, first on the side of pregnancies which may be of shorter duration, and still more on the side of those which extend beyond the period just named. Grave legal cases have occasionally resulted either from the short duration of pregnancy, or from its extreme prolongation. In the first place, the fact of a fully-formed child being born before its time may cause inquiry to be made regarding the period of conception, and it is clear in such an instance that grave doubts might be cast upon its paternity. A similar result has accrued in cases where children have been born long after the period when, according to the circumstances of the parents, birth might have been expected. There is little doubt that allowance must be made for a certain period both below and above the normal duration of pregnancy, seeing that variations may exist here as in respect of other functions of the human frame.

When Labour will be Due.—The usual way to estimate when labour will occur is that of calculating 280 days from the first day of the last menstrual period of the woman. But as regards the actual occurrence of the confinement, the rule which probably brings us nearer to the actual date of the confinement is that of counting three months backwards from the last day of the last menstruation, and of adding seven days. According to this rule, a woman who ceased to menstruate on the 1st of January would fall due to be confined on the 8th of October following. A woman similarly ceasing to menstruate on the 1st October would be due to fall in labour on the 8th of July. This rule depends on the fact that probably she will have conceived a few days after menstruation has ceased. It is of importance to note, however, that if she has conceived, not immediately after the last menstruation ceased, but shortly before the next period was due, labour would not necessarily occur at the date fixed by the above calculation. Where doubt exists, the period of quickening, as already described, will probably form the best guide. Four and a half months should be added from the period of quickening, although this only gives an approximate notion of the date at which the confinement may be expected.

False Pregnancy.—This condition is worthy of note, because,

while the symptoms of natural pregnancy may be fairly well imitated in many of their aspects, there is, nevertheless, an utter absence of all the real signs of conception. Such cases come into the category of those to which reference has been made, where an unmarried woman may be suspected of being about to bear a child. "False pregnancies" are known to occur in women of a hysterical type. In them menstruation may be very deficient or absent, whilst enlargement of the breasts may take place, and morning sickness be present. In the case of a married woman, so convinced may she be that pregnancy has occurred, that a nurse will be engaged, and the date of the confinement fixed. Hysteria is an ailment in which the symptoms of almost every other disease are liable to be imitated. Naturally it requires the assistance of a physician to determine whether or not the pregnancy is real or spurious. There would in such a case be no sounds heard of the foetal heart. Again, the abdominal tumour or swelling will disappear if the patient has chloroform administered to her, because of the relaxation of the muscles thus produced. Such cases are frequently difficult of detection, and are amongst the most annoying and most anxious with which doctors have to deal.

Maternal Impressions.—It is proper here to revert to a subject which has been the cause of a vast amount of discussion, not merely amongst the medical faculty, but even amongst the general public at large. It is a common matter of belief amongst the public uneducated in medical matters that if a woman is subjected to any undue influence whilst she is pregnant, and is, say, frightened by some object or occurrence, certain effects are liable to be produced on the child. Thus, a woman who bears an undeveloped child, especially one in which the head parts have not attained to their full growth, will attribute this misfortune to having been frightened by a frog or toad which had suddenly jumped out before her. Cases are commonly believed in, in which a child, born with what are called "mother's marks," imitating the form of strawberries, have their origin accounted for by some one having startled the mother while pregnant by hitting her on the face with the fruits. It is an extremely difficult matter to determine whether or not the mental impressions of a pregnant woman are capable of producing on her unborn child the effects in question. Certain cases have been reported in the medical journals which appear to lend support to the view that such an occurrence is at least possible. That it is a probable matter, or that the defects of infants are to be accounted for on the part of maternal "impressions," is on the other hand extremely doubtful. Many infantile defects are to be explained on the ground

of violation of the ordinary laws of development apart altogether from the "impressions" of the mother. At the same time the rule holds good that where a woman is pregnant, and where in consequence she ought to be guarded with care and her health rigidly supervised, it is well to ensure freedom from all sources of extraneous irritation. We must remember here the lesson conveyed by the familiar saying, *Post hoc, ergo propter hoc*. In other words, it is an illogical idea to attribute a given result to a certain cause to the exclusion of other and more scientific reasons.

Health in Pregnancy.—Again we may say that as regards the health of the pregnant woman, everything must be done to secure proper and appropriate surroundings for her. No doubt exists that the welfare of the unborn child must largely depend upon the health of the mother. She, of course, is intimately associated with its development from the first to the last stage. The state of her blood, depending on the nutrition of her body, must, for example, form a highly important condition in determining the welfare of her child. Stimulation and excitement of all kinds should be avoided. Her life should be regulated according to the principles of strict regularity. She should enjoy a full amount of rest and sleep, this rule applying especially to the later period of the pregnant state. No special rules are required either for her nourishment or for the conduct of her life in other respects. That is to say, she must follow the ordinary dictates of health science in respect of the regulation of her existence. In particular, she must avoid all tight constriction of clothing. Tight lacing must be absolutely forbidden. Garters, for example, which tend to constrict the upward flow of blood in the veins of the legs, should be avoided. The state of her bowels also demands attention, and it will be well, whilst avoiding anything like free purgation, that she should, by taking a proper dietary and, if need be, an occasional dose of a mild laxative (such as liquorice powder), to maintain the bowels in proper working order. Especially is the rule to be noted that, as *abortion* or *miscarriage*, like labour itself, occurs at what would be in her non-pregnant state a menstrual period, *the woman should rest at such periods*. In this way the chances of any risk of miscarriage will be the more readily avoided. In cases where derangements of health occur during pregnancy, the services of a medical man should be requisitioned. For example, if morning sickness be very persistent, treatment for that condition will be necessary. Such details will be dealt with in the present volume of this work when considering the troubles and affections incidental to the pregnant state. Especially should she be taught to avoid any anxiety over the birth of the child.

Under ordinary circumstances, *labour is a perfectly natural function*, and is, in the case of the healthy woman, easily accomplished without undue pain. Hence the pregnant woman should have cheerful society, and be cheered and comforted by those in her immediate environment. A hopeful mind in these cases, as in all others of bodily trouble, forms one of the most important conditions whereby a natural result in the case of labour may be hoped for and attained.

SECTION III

AILMENTS OF MENSTRUATION AND PREGNANCY

Ailments of Menstruation.—We shall later discuss the course of events in natural labour, and in the more common complications of labour, and we may therefore turn our attention altogether from labour itself and consider some other aspects of female disorders. It will be well for the sake of clearness to deal first with the ailments associated with the condition of menstruation, and then take up those which are apt to be encountered during the pregnancy, finally dealing with the more important complications which may arise during the time of the puerperium. The reader is advised to turn back to those sections of this work in which the anatomy and physiology of the female genital organs are described, more especially to those paragraphs which refer to the uterus or womb in connection with normal menstruation. In what follows here it will be presumed that this has been done.

General Symptoms during Menstruation.—At the present day a very large number of women seem to suffer a good deal of discomfort, apart altogether from actual disease, during their normal menstrual periods. The degree of this suffering varies immensely in different individuals. While some are so little affected that they can go about their daily avocations as usual, others are completely prostrated for one or two days and unfit for any active part in life for the time being. This should always be taken into account in considering the kind of occupation to be taken up by a young woman. Others are intermediate between these two extremes, feeling slightly tired or dull for a day or two, and then quite well. Many complain of headache, and almost all women are unusually irritable at this time, saying and doing things quite at variance with their normal healthy moods and character. Very commonly there is pain and discomfort

during the twelve or twenty-four hours preceding the appearance of the menstrual flow, which is relieved when the flow is established. It will be remembered that the duration of normal menstruation varies from three to six days, and that the intervals between the periods may be three and a half, four, or four and a half weeks, without any morbid condition being present. There are women who menstruate every three weeks, but this is uncommon. In our opinion it cannot be too clearly understood that most women are, for two or three days in every month, not themselves. If this fact were more widely known and appreciated a great deal of unpleasantness and misunderstanding would be avoided, and women would not be expected to do things at times when nature demands that they should be resting.

Absence or Suppression of Menstruation.—The first serious disorder of menstruation calling for notice is the condition known as “Amenorrhœa,” or absence of the periodically recurring discharge of blood in a healthy woman who is not pregnant, and who has not reached that time of life when the menstrual periods cease. The most common cause of this suppression of the monthly flow is the woman becoming pregnant—it is one of the signs of pregnancy; but there are many other conditions which will also cause cessation of menstruation. It occurs usually immediately after conception, and for that reason is commonly relied upon for calculations of the date at which the confinement may be expected. Taken by itself, however, it is not a very valuable sign; the other signs of pregnancy referred to on a previous page must be considered along with it.

Causes of Amenorrhœa.—Apart from pregnancy the most common causes of suppression of menstruation are: Gradually increasing anæmia; the fear of being pregnant; the desire to be pregnant; the onset of the “change of life”; an imperfect development or atrophy of the womb; and convalescence from some severe diseases such as typhoid fever, pneumonia, or other such conditions.

Symptoms of Amenorrhœa.—The one outstanding symptom is, of course, the non-appearance of the flow at its usual time. The other symptoms will depend upon the particular cause at work. If it be due to loss of blood, the patient may feel better than she did before. The condition may be sudden, or it may come on gradually, each period being marked by a less discharge than the one preceding, until finally no flow at all is observed. Occasionally when the flow from the womb ceases there are discharges of blood from other organs, such as the lungs, stomach, intestines, skin, &c., the condition termed “vicarious menstruation.” These abnormal discharges come on at regular intervals just as the menstrual one does. The patient must be carefully examined to ascertain the presence or absence of the causes given

above, the symptoms of which will correspond to whatever special cause is present. Thus if anæmia is the cause, she will be pale, breathless, &c., and so on.

General Treatment of Amenorrhœa.—It will be obvious here again that the treatment depends upon the special cause. It is the cause of the suppression which demands treatment; for example, the anæmia. "Where general nutritive disturbance has led to amenorrhœa, the treatment should consist in careful regulation of all the bodily functions; the patient should retire early, and not sleep too late in the morning; she should have a nutritious and easily digestible diet; she should take food at intervals of only three hours; animal food must not be insisted upon, but her appetite and digestion should be improved by wine, beer, bouillon, milk, and other liquids; exercise in the open air is essential," and regular evacuation of the bowels must be secured. Care should be taken that mental occupation be not too severe; in fact, continued exertion, whether mental or physical, must be positively forbidden. Light household duties are better than severe thinking and studying. Parents are often difficult to persuade in this matter, and frequently the patient is better if removed from the care of over-anxious parents, and sent to friends in the country, where a free and easy open-air life for some weeks often suffices to send back the patient well and strong, the menstrual flow soon reappearing.

Medical Treatment of Amenorrhœa.—In addition to this general treatment the medical treatment is important. One or other form of iron is of great service in anæmic conditions. Large doses have to be given over a considerable period of time, the usual mistake being to stop the treatment too soon because the patient feels better. Months are necessary for the best results to be obtained, and sometimes years. The doses may be gradually reduced and taken at longer intervals, thus gradually discarding the medicine. The clothing must be warm and exposure to severe weather avoided. Certain baths are good, an account of which is given in our last volume. As for the many so-called "cures" for this condition, of which the daily papers contain innumerable advertisements, it is better not to use them. Purgatives and iron sum up the most efficacious medical treatment, anæmia being the usual cause to be treated. Massage is often an additional benefit, especially for those patients who cannot get to the country for change of air and exercise. When amenorrhœa is due, as it not uncommonly is, to mental fears or desires, or shocks, the treatment must be directed to restoring a healthy state of mind to the patient, and, should she be under any delusion as to her condition regarding pregnancy, it may be necessary to have her examined by a

physician whose assurance will be the only way of satisfying her mind.

Profuse Menstruation or Menorrhagia.—This condition includes a widely varying group of morbid states, of which it is a prominent symptom. It is precisely the opposite condition to that of suppression of the flow. Here the discharge of blood is excessive or profuse. That is, as we say, a symptom of many diseases, rather than a disease in itself. Amongst the prominent causes may be mentioned tumours of the womb, displacement of the womb, liver or kidney disease, and heart or lung troubles. Strong mental impressions, chronic constipation, and great deposit of fat, also play a part in its causation.

Symptoms of Profuse Menstruation.—The marked thing here is, of course, the noticeable increase in the amount of blood lost at each period, compared to that which is normal for that particular individual. In addition there is pallor of the lips, cheeks, and the conjunctivæ of the eyes. Noises in the ears, specks before the eyes, headache, muscular weakness, and constipation, are also present. These come on gradually as the discharge becomes more profuse. Women bear loss of blood remarkably well, much better than do men, and hence the symptoms are not all apparent for some time. There is not much actual pain, but there is unusual sensitiveness in all the organs of sensation. These are shown in the acute sensibility of the patient to light, noise, disagreeable odours, and so forth, which in her healthy condition would not trouble her.

Treatment of Profuse Menstruation.—The treatment is directed to the removal of the cause which is responsible for the excessive loss of blood, and then to the anæmia produced. Displacements of the womb must be put right, tumours removed, and the diseases of the heart, lungs, or other organs treated as they occur. Local applications to check the bleeding take the form of cold ice-bags applied externally, and vaginal injections of solutions which check bleeding, such as sulphate of zinc, alum, or tannin. The womb itself may have to be treated; in severe cases the solutions brought into contact with the wall of the womb. Internally, ergot, mineral acids, digitalis, and the fluid extract of *Hydrastis Canadensis*, have been used with advantage. Surgical interference is called for in bad cases resisting all other means of relief.

Painful Menstruation or Dysmenorrhœa.—As before remarked, most women suffer more or less discomfort just before or during the menstrual period, but actual severe acute pain is to be regarded as abnormal, and a sign of some diseased condition. It is once more a symptom of something else, as a rule—of disease of the

womb, ovaries, or the tubes. The pain may, however, be due, not to these organs themselves, but to some condition which is making it difficult for the discharge to escape from the vagina. Here the pain comes from the distension of the passages with the accumulated blood. In one form which occurs in young girls there is sudden and intense pain recurring at intervals, this being caused by fright, violence, or masturbation. In other cases where no cause can be discovered, it often appears later that there were small growing uterine tumours in the wall of that organ. Lastly, inflammation round the region of the womb and ovaries is a common cause of this painful menstruation.

Symptoms of Painful Menstruation.—In addition to the actual pain, we find a feeling of heat along with cold hands and feet, cramp, headache, and even hysterical convulsions. The patient is exhausted for some days after an attack, and then recovers until the next menstrual period. After this has gone on for some months she gets very dejected, miserable, and irritable, and unable to perform her usual work even in the intervals between the periods. Appetite and digestion are both impaired. The pain being merely a symptom of a long list of diseases, the treatment falls under that of the various conditions producing it.

Treatment of Painful Menstruation.—Speaking generally, the patient should remain in bed at any rate at the early part of the period of menstruation, avoiding all mental worry and effort. She is apt to be nervous and excitable at this time, and her whole condition is such as to make all physical or mental strain highly undesirable. Hot drinks internally, and hot applications over the seat of the pain, give relief. The hands and feet should be kept warm, as patients suffer much from cold in this condition. A very important point then arises, namely, the question of the use of narcotics to relieve the pain. It is a great temptation, to the young physician especially, to give a hypodermic injection of morphia whenever the pain is violent, because the parents almost invariably prefer this treatment in the painful menstruation of young girls, being averse to vaginal examinations, and distressed at seeing their children suffer. There is great danger of the abuse of the drug here, and it is one source of the morphia habit. Such patients should never know how to use a hypodermic syringe, nor should their attendants have that knowledge either. There are cases, of course, when such treatment is unavoidable and necessary, but morphia subcutaneously should be the last resort.

Ailments and Diseases of Pregnancy.—Leaving now the subject of disordered menstruation, we turn our attention to the

pregnant woman and the complications which may arise during the term of her pregnancy, complications which are some of them slight, some of them serious, but all of which demand careful study at the hands of those who have the care of pregnant women. The welfare of both mother and child is at stake here, and the life of one or both may easily depend upon the proper treatment and the due recognition of some of the many disorders which are apt to occur in pregnancy. The diseases of pregnancy may be grouped into three classes :—First, those which are in no way due to the pregnancy itself, but which have a profound influence on the pregnant woman, or are themselves altered from the fact of her being pregnant; second, those diseases which arise during the pregnancy and because of that condition; and third, those diseased states of the womb and the developing child which seriously affect the normal relationship between the mother and the child within her, in such a way as to cause danger to the life of one or other or both. Of these three groups the two latter are by far the most important to us here.

Diseases Complicating Pregnancy.—These diseases are dealt with fully under their respective heads; at this point we refer only to their connection with pregnancy, and we note only the most important of them. These are :—Pneumonia, consumption, smallpox, scarlatina, measles, typhoid, typhus, malaria, syphilis, and heart diseases.

Pneumonia in Pregnancy.—It is said that there is a greater susceptibility to this condition in pregnancy, and the disease is certainly aggravated in the later months of pregnancy because of the increased difficulty of breathing due to the movements of the diaphragm being impeded, and to certain blood changes. The effect upon the pregnancy of the pneumonia is to kill the developing child from the high temperature, and so to bring about a premature expulsion of the contents of the womb. Severe pneumonia almost always causes abortion, which usually aggravates the disease. It is a very serious complication of pregnancy. The outlook for the mother is always grave, but varies with the time of the pregnancy; the later in the pregnancy the more dangerous for the mother. To the fœtus the outlook is very grave from the high temperature.

Consumption in Pregnancy.—Authorities differ a good deal as to the effect of pregnancy on phthisis or consumption, but it may be taken that pregnancy acts on consumption by precipitating its development and hastening its progress (Haultain). Apart from the family hereditary history, therefore, the practical deductions are that consumptive women should not marry; and if they do and bear children, they should not nurse their children. Many advanced

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social reformers hold the opinion that it ought to be illegal for consumptives to marry, and indeed it is difficult to justify the absolute freedom given to diseased persons to marry and have offspring, at any rate from the point of view of national health.

Smallpox in Pregnancy.—Pregnancy has no effect on this condition, but smallpox in some of its forms affects pregnancy by tending to cause premature expulsion of the contents of the womb; the later the pregnancy has advanced the more serious being the outlook to the mother. On the child the effect is frequently death from high temperature; or it may live to be born healthy; or it may be born with smallpox; or it may develop smallpox soon after birth. In the case of twins one may be born with smallpox and one escape. If born healthy the child generally resists vaccination.

Scarlatina in Pregnancy.—It is a curious fact that women seldom suffer from scarlatina or scarlet fever *during* their pregnancy, but they are especially liable to it just *afterwards* during the puerperium, when it is a dangerous complication. If it does occur in pregnancy, abortion is apt to follow and the mortality is great. The foetus may or may not be attacked. In the puerperal period it gives rise to one of the most virulent forms of fever to which the patient is liable.

Measles in Pregnancy.—Pregnancy aggravates the type of the disease in measles, and in addition makes the respiratory complications worse; while measles causes abortion in about half the cases of pregnancy affected, the mother usually recovering. The foetus may suffer from measles in the womb, or it may develop the condition after birth.

Typhoid Fever in Pregnancy.—Pregnancy seems to somewhat lessen the severity of typhoid fever, while the puerperal period has the opposite effect. In about half the pregnancies abortion occurs or premature labour, and when this happens the outlook is grave.

Typhus Fever in Pregnancy.—This fever, nowadays happily almost unknown in this country owing to sanitary and hygienic improvements, is the most fatal of all fevers to both mother and child.

Malaria in Pregnancy.—Pregnancy seems to lessen the severity of malaria and also to change the periodic character of the attack. Malaria may cause abortion, or the child may be born with malaria. The treatment—large doses of quinine—does not cause the womb to expel the child as a rule.

Syphilis in Pregnancy.—Pregnancy aggravates the early symptoms of this disease and ameliorates the secondary symptoms; while the effect of the disease upon the pregnancy is to cause abortion in rather more than half the cases. The child may be born healthy,

syphilitic, or develop syphilis shortly afterwards. The wet nursing of syphilitic children should be forbidden, and the mother allowed to nurse the child.

Heart Diseases in Pregnancy.—All heart diseases tend to cause premature labours, while pregnancy tends to make the heart diseases worse, chiefly on account of the increased strain during pregnancy, and especially in labour. The most dangerous is that condition in which there is venous congestion, dropsy, and congestion of the lungs (mitral disease). If there is a very marked mitral disease present the dangers of pregnancy and labour should be pointed out before marriage. No rule can be laid down, as every case must be judged on its own merits.

The above are the most important conditions which modify or are modified by pregnancy, and we now pass to the second group, those conditions which are actually due to the pregnant condition of the woman.

Vomiting in Pregnancy.—This is one of the most troublesome and common of the ailments associated with and due to pregnancy, varying from a mere matter of discomfort in some cases, to a serious and grave disease in others. Its onset is usually insidious, and in the majority of cases it makes its appearance in the early months of the pregnancy, usually before the fourth month. On account of its regularity of appearance every morning it has been termed "morning sickness," but it is by no means restricted to that time. In fact the first stage of this vomiting is generally marked by constant nausea and vomiting after every meal. The term "morning sickness" is restricted to that milder form of vomiting which begins usually after the first menstrual period missed, and which ceases sometime during the fourth month as the womb rises out of the pelvis. Should it not cease at that time it becomes really "uncontrollable vomiting," and a serious complication. Following upon the occurrence of vomiting after every meal the patient becomes thin and weak from comparative starvation and wears an anxious look. At times the trouble disappears for a time only to return later. The next stage is an aggravation of this, and in addition a rise of the temperature along with cold hands and feet and a great tendency to fainting. Finally in the worst cases of all the vomiting diminishes and the fever increases, until at last mental symptoms appear, delirium, unconsciousness, and even death.

Causes of Vomiting in Pregnancy.—This mysterious symptom has been ascribed to a great variety of causes, the most frequent in all probability being the unusual distension of the womb during pregnancy. The vomiting is generally more severe and more frequent in

women who are pregnant for the first time, a fact which supports the view of being caused by unusual distension. Amongst other causes may be mentioned: simple "flexions" or bendings of the womb; erosions of the neck of the womb; mental factors, such as great sorrow; the presence of albumen in the urine; and other rarer conditions.

Effect of Vomiting in Pregnancy.—The outlook is not serious unless the vomiting passes beyond the first and usual stage into that where a rise of temperature makes its appearance, when the vomiting becomes a serious matter. The result may be that a premature birth is brought about which is not altogether a disadvantage in cases of severe vomiting, but on the other hand this may be in itself a serious matter, especially in a patient much weakened by continuous sickness.

Treatment of Vomiting in Pregnancy.—The vomiting should never be neglected, but should be treated early. As far as dietetic treatment is concerned care must be taken to avoid all foods likely to sicken the patient, and especially must the monotony of one special diet be avoided. The food must be plain in itself and given in small quantities at a time. Any particular wish of the patient for some special food may usually be gratified unless it is an utterly ridiculous desire, because people vary so curiously in the matter of what suits their stomachs. It is only in severe cases that it is necessary to give milk and potash water, but this may be necessary; indeed, so irritable is the stomach sometimes that it becomes necessary to give peptonised food per rectum. As regards medicinal treatment a wide variety of drugs has been recommended, of which probably the most satisfactory are bismuth and oxalate of cerium in doses of ten grains of each before meals. Strongly commended by some, too, is tincture of *nux vomica* given in doses of two to five drops three or four times a day or oftener. Hot water, a teaspoonful at a time, relieves some; iced drinks relieve others; while in a third class of cases a change of air and scene does great good. Morphia in the hands of a medical man is often most valuable. Care must be taken to avoid constipation, and hot poultices may be applied over the region of the stomach. Finally the physician may advise that the case be ended by inducing premature labour if he fears that the vomiting is going to become violent and uncontrollable.

Excessive Salivation in Pregnancy.—Associated sometimes with vomiting, but also occurring by itself, is the condition of great secretion of saliva, which usually begins early in the pregnancy and is practically incurable. Relief is, however, obtained by giving bitter preparations such as quassia, orange peel, or an astringent solution to

wash out the mouth. The condition terminates with the delivery of the child at labour.

Constipation in Pregnancy.—As far as possible this condition should be avoided by keeping the patient on a suitable diet, and it is important to remember that in any case the medicines used to cause movement of the bowels should not be drastic purgatives, but mild laxatives such as magnesia, compound liquorice powder, prunes, or some of the mild aperient waters such as Hunyadi. If the patient suffers from piles a pill containing aloes, hyoseymus, and ipecacuanha is useful. In this latter case, too, half a pint of cold water may be injected into the rectum night and morning.

St. Vitus's Dance, or Chorea, in Pregnancy.—This affection is fortunately not a common one in the pregnant woman, though much more common in the female sex than in the male. Although rare in pregnancy, it is of importance from its gravity when it does occur. It is generally in the woman who is pregnant for the first time, and often in a patient who has had previous attacks of the condition, whilst in others it occurs along with a tendency to rheumatism. It may supervene at any period of the pregnancy, but is most common in the early months—three-quarters of the cases occurring before the fifth month of the pregnancy. The patient is usually between twenty and twenty-five years of age.

Symptoms and Treatment of Chorea in Pregnancy.—The symptoms of this condition are simply those of the disease as seen at any other time, except that in pregnancy they are apt to be exaggerated. They come on gradually, as a rule, but may appear suddenly. They may cease or persist throughout the pregnancy. About half the cases abort, and one of the gravest results is brought about by the sleeplessness which chorea causes. The treatment is that of ordinary cases referred to in a previous volume, and the sleeplessness, which is a grave symptom in pregnancy, must be treated early by sulphonal or other soporifics.

Varicose Veins in Pregnancy.—The increase of the abdominal pressure and the pressure of the womb on the iliac veins both tend to produce a varicose condition of the veins of the legs in pregnancy, and this is worse in women who have had former pregnancies than in first ones. In the legs the condition must be treated as if in a non-pregnant case. Should the veins of the vulva or vagina show the condition, the patient must be kept in the recumbent attitude. The ordinary treatment has been dealt with in a previous volume.

Jaundice in Pregnancy.—Simple jaundice is rare in pregnancy, but serious, as it may be the forerunner of a very dangerous

form of jaundice termed acute yellow atrophy of the liver, a disease to which there is a special tendency in pregnancy, and the mortality from which is almost half of all cases which occur. The symptoms and treatment have been discussed when ordinary jaundice was taken up.

Ailments of the Bladder in Pregnancy.—Amongst other ailments of the bladder one often encounters cases which show great frequency of micturition in the early months of pregnancy, the patient constantly wanting to pass water. Then at full term there is often a certain amount of difficulty in passing water, but as a rule these are not serious, although the latter requires treatment as described in the management of labour on a former page.

Albumen in the Urine in Pregnancy.—This condition, called albuminuria, is one of the most anxious complications of pregnancy, and it occurs in about three per cent. of all cases. It may occur at any time, but is especially frequent in the later months, commonly appearing first during labour, and three times more frequent in first labours than in women who have had previous children. It is caused by a variety of conditions such as bladder affections, pre-existing kidney disease, increased tension of the blood in the kidneys in pregnancy, obstruction to the flow of blood in the veins from abdominal pressure, and from nervous influence.

Signs, Symptoms, and Treatment of Albuminuria.—There may be no signs except the presence of the albumen, which is detected on making a chemical examination of the urine. Or there may be puffiness of the face and eyelids from dropsy in those parts along with a quick and hard pulse, and "casts" in the urine which are the debris of kidney tissue. No results need follow albuminuria, but on the other hand the most serious may do so. There may be permanent kidney disease left, or convulsions may be produced, the outlook depending upon the amount of albumin present. If local dropsy and convulsions appear, almost a quarter of the cases die. It, therefore, is of great importance that the urine of all pregnant women should be carefully tested, especially during the later months of the pregnancy, and more especially in first pregnancies, so that treatment may be begun at once if the albumen be detected. This resolves itself into dietetic and medicinal measures, of which the former consists of an absolute milk diet, four quarts of milk being given at least per day. Should the albumin disappear the patient may be tried on ordinary diet again, but any return of the symptom indicates the desirability of the milk diet at once and rigidly. Medicinal means may be taken to relieve the action of the kidneys by inducing a more active secretion by the glands of the skin. Hot baths will

assist in this, as will also saline purgatives to keep the bowels open. Of actual drugs, heart tonics such as strophanthus are prescribed, as well as belladonna, buchu, and pilocarpine subcutaneously to stimulate perspiration.

Convulsive Seizures in Pregnancy.—We are now approaching the consideration of the ailments and complications of either the end of pregnancy or of the time immediately following the conclusion of labour, the puerperal period. Of these complications none are more alarming than attacks of convulsions, especially the type of convulsion which is termed “Eclampsia,” or puerperal convulsions. This condition is defined as “a convulsive seizure simulating epilepsy, but without any cry,” such as there is at the onset of a true epileptic attack. Eclampsia is thus an acute disease which occurs in women during pregnancy, during actual labour, or in the puerperal period—often sudden in its appearance and rapid in its progress, characterised by convulsions with loss of sensation and, therefore, of consciousness, and ending in the condition of “Coma.” There is an intimate connection between this condition and albuminuria which we have just considered. Eclampsia is most common in the last months of the pregnancy or during labour, and is five times more common in first labours than in subsequent ones. Altogether, it occurs in about one out of every five hundred cases. The actual cause is not clearly established. It is thought to be due to an anæmic condition of the brain. Whatever the exact cause it is a most serious condition, as many as 26 per cent. of cases terminating fatally; and it is the more serious if it be due to disease of the kidneys already present, or if it develop during pregnancy. To the child also the outlook is bad; premature labour may occur, or the child may be suffocated.

Description of the Attacks.—There are two distinct types of the convulsions or fits, called respectively “Clonic” and “Tonic,” which usually occur one after the other in the same attack, but may appear independently of one another, or alternate with each other. In the clonic fit there is twitching of the muscles of the face, the eyes roll about, causing facial contortions. Along with this there are quick spasmodic movements of the head and the arms and legs. The breathing is deep, and the patient looks blue. In the tonic type of attack the eyes are fixed, the tongue is pushed out of the mouth, the face distorted, and the back muscles are often rigid, causing the patient to lie straight out stiffly. The eyes look bloodshot, and the patient blue, the picture altogether being a most alarming one.

“During the attack the patient is insensible to the most powerful external excitants; she can neither see, nor hear, nor feel. Coma or stupor follows the clonic convulsions, the duration of the coma being

proportional to the severity of the attack. In most cases, within half-an-hour after the convulsive movements have ceased, the patient awakens, at first into a sort of semi-consciousness ; she looks upon those surrounding her bed, and does not at once recognise them ; when recognition comes, she does not understand the anxiety which their countenances so often betray ; her face has a sadly bewildered expression, the past, so far as the convulsions are concerned, is a perpetual blank, and the present a temporary cloud. In rare cases the patient's recovery immediately begins, and is rapid and perfect. But in the majority eclampsia is not limited to a single attack ; other attacks generally follow, the intervals varying from a few minutes to several hours. The attacks may be so rapid, the intervals so brief, that the patient passes directly from coma to convulsions without a moment of even partial consciousness intervening."

Duration and Frequency of Fits.—Generally speaking, each fit lasts from a quarter of an hour to twenty minutes, and when over the patient is naturally in a very dazed state, and the temperature may be somewhat raised. Both the severity and the number of the attacks vary considerably. Should the fits be very numerous, and follow each other at short intervals, the unfortunate patient is in a state of absolute stupor between the fits, and eventually becomes comatose. Death frequently results from apoplexy, or dropsy of the brain or lungs. The number of attacks may be only two or three, ten to twenty, or there may be a hundred.

Treatment of Eclampsia.—If the probable advent of a fit be recognised by the perversion of the special senses, give syrup of chloral in doses of one drachm every two hours for eight hours, in addition to the means referred to under albuminuria, for assisting the kidneys and perspiration. A prolonged hot bath (112° F.) helps to stimulate the action of the skin. A purgative (*e.g.* 60 grains of compound jalap powder) should be given, and a milk diet insisted upon. During the attack the physician will see that the clothing of the patient is loose, and will forbid any efforts—which are quite useless—to restrain her movements, taking care that she does not throw herself from the bed or otherwise injure herself. The tongue especially must be protected or she will bite it ; this can be prevented by stretching a soft napkin between the jaws to prevent the tongue protruding. Then chloral is administered per rectum, or the patient is put under chloroform, these two modes of treatment being those usually adopted. Should the labour-pains be in progress, the labour should be completed as quickly as is consistent with the safety of the patient. The condition altogether is a very grave one, and demands the most skilled attention from the onset.

Abortion.—Before passing to the puerperal period, we have still to consider one very serious complication of pregnancy, namely, abortion or miscarriage; by which is meant the premature expulsion of the contents of the womb before the foetus can live by itself. That period is the seventh month, so that expulsion of the womb contents before the seventh month constitutes abortion. After the seventh month, and before the full term, such a complication is called a premature labour. Abortion is a very common accident, so much so that it happens in almost one of every five pregnancies, and it is stated that “37 per cent. of child-bearing women miscarry before thirty years of age.” This usually happens after the first pregnancy, in subsequent ones, and takes place, as a rule, before the fourth month of the pregnancy, at a period which corresponds to what would have been a menstrual period had the woman not been pregnant.

Causes of Miscarriage or Abortion.—It can be readily understood that the causes which may bring about a miscarriage are almost innumerable, varying from sheer carelessness, through disease, to actual criminal intent. We may mention the more important. On the part of the father syphilis is a common cause, as well as extreme youth or extreme old age. On the part of the mother, we have any poison in the blood, syphilis, fevers, jaundice, albuminuria, and diseases of the lungs and heart. The blood may be poor from vomiting, prolonged suckling of a former child, or from actual starvation. High temperatures, such as occur in pneumonia or rheumatic fever, will also cause abortion. It may be due to purely nervous states, mental shocks of an emotional nature, a fright, a terrible sight, and so forth. Local diseases of the womb of various sorts will cause abortion, such as fibroid tumours, diseases of the membranes and after-birth, displacements of the womb, and congestion. Irritation from the bladder or bowels may have a similar effect, and finally, direct violence frequently brings about a miscarriage. The most common forms of violence are those associated with riding on horseback, dancing, bicycling, or even jolting in a carriage over rough roads. It therefore follows that women should be particularly careful during the first three months of their pregnancy to avoid all forms of excitement and physical strain. Lastly, the foetus itself may be the cause of the abortion by its death in the womb from some cause—the presence of an excess of water, or some abnormality in its development.

Symptoms of Abortion.—The two outstanding symptoms of an impending miscarriage are bleeding and contractions of the womb (pains). These may occur together or quite independently. The former is a sign that the foetus has separated from its attachment. The hæmorrhage is sometimes slight, at other times so great as to be

a danger to the life of the mother, coming away frequently in clots. In many cases it is the bleeding in the womb which gives rise to the contractions which follow, and which cause the foetus to be driven out. The pains or contractions themselves are always intermittent, and may be weak or severe. They bring about the complete separation of the foetus, and dilate the neck of the womb, just as they do in labour.

Varieties of Abortion.—An abortion is said to be Threatened, Inevitable, Missed, or Imperfect. “A threatened abortion is said to be present when the signs and symptoms are sufficiently slight as to allow of reasonable hope that the death of the ovum and its expulsion may be averted. An inevitable abortion is said to be present where the signs or symptoms are so severe that the death or expulsion of the ovum is assured. By imperfect abortion is meant the retention in the womb of some portion of the ovum after abortion. A missed abortion is the term applied to cases in which the death of the ovum takes place, but expulsion is delayed for a considerable period (perhaps a year).”

Treatment of Abortion.—If a miscarriage be threatening by the symptoms given above, every means should be taken to endeavour to ward it off by keeping the patient in bed with absolute rest; emptying the bowels by an enema, and administering a suppository of morphia. If the abortion be inevitable, there is nothing for it but to see that the contents of the womb are expelled as soon as possible, and as thoroughly as possible. This is of course a matter for the obstetrician, who will probably have to dilate the neck of the womb artificially, separate the contents, and scrape out the interior of the womb, using an antiseptic solution. This operation will be done under chloroform, if possible, as it is a painful one. If the abortion be imperfect, the discharges must be carefully examined to see how much is still retained in the womb, and then the retained portion scraped away by the finger, and the womb washed out as before. Subsequently the patient must be kept in bed for a time, and ergot given in doses of one drachm three times a day to prevent bleeding. A missed abortion has to be regarded practically as an inevitable one, inasmuch as the contents of the womb must be extracted. After any kind of miscarriage, the patient should remain resting in bed for at least one week after all bleeding has disappeared, so that the womb may have the opportunity of returning to its normal condition the more readily.

Prevention of Abortion.—It will be gathered from the list of causes which may give rise to abortion that a very large number of these cases could be prevented by the exercise of a little forethought and common-sense on the part of the pregnant woman.

And this is actually the case. Many women once they begin to have miscarriages go on doing so in successive pregnancies, get into the so-called "habit" of aborting; but where this occurs it is frequently due to some disease such as syphilis, or a chronic inflammation of the lining membrane of the womb, conditions which must be treated themselves before the patient can expect to carry a child to full term. All the same, a great deal can be done by simply making up the mind to live a quiet healthy life during the early months of pregnancy, especially avoiding all forms of mental excitement and severe physical exercise, the precautions in these matters being redoubled at those periods of the pregnancy which correspond to what would have been menstrual periods if the pregnancy had not supervened. All details concerning the management of the hygiene of pregnancy have been treated of on a previous page.

Complications of the Lying-in Period, or Puerperium.—

Having now considered most of the important complications to be met with in labour and during pregnancy, we may turn our attention to the subsequent history of the patient, that part of her child-bearing life which follows immediately after the delivery of her child, the time known as the puerperium. In a normal case where all goes well this is passed partly in bed and partly up, ten days being allowed in bed before the patient begins to get about again. This puerperal period is a time of great importance to a woman; during it she undergoes great recuperative changes, which are directed towards restoring her general condition and that of the reproductive organs particularly to the usual healthy non-pregnant state. The duration of the period is usually reckoned to be that time which elapses between the birth of the child and the return of the womb to its normal size and condition, and this takes about six weeks. A great deal may happen during that time; many complications may arise, some of which are regarded as minor, others as grave complications.

Minor Complications of the Puerperium.—The minor complications are those concerned with the decrease in the size of the womb: abnormalities of the vaginal discharges; irregularities of the bladder causing frequency or retention of urine or inability to retain it in the bladder; and disorders attendant upon the breasts and milk secretion.

Complications arising from the Womb.—The first of these is that condition known technically as "subinvolution" of the womb, which simply means an absence of the normal decrease in the size of the womb. This may result from there having been a delayed labour; from over-distension of the womb, as in twins; from retention

of parts of the membranes or after-birth ; from inflammation ; and especially from the patient getting up too soon after labour. There are no prominent symptoms at first, unless it is due to retained portions of the membranes or inflammation, but after several weeks or even months the patient suffers from profuse menstruation, backache, and vaginal discharge. It is one of those conditions we referred to on a previous page as being dependent upon adequate rest in bed not being obtained after the completion of pregnancy and labour. The treatment is to give a hot vaginal douche (105° to 110° Fahr.) three times a day, and of course to remove anything which may be retained in the womb and which is giving rise to the trouble. Very rarely the exact opposite of this condition may occur, an excessive decrease in the size of the womb causing an atrophied womb. Treatment in this case is practically useless, as the patient has to all intents and purposes reached the menopause.

Abnormalities in Vaginal Discharge.—The vaginal discharges, or lochia as they are termed, may suddenly cease, the result of some inflammatory condition or mechanical obstruction to their escape. They may be excessive from incomplete diminution in the size of the womb, or they may become foetid from some retained products undergoing decomposition. In this case the cavity of the womb should be washed out with an antiseptic solution.

Abnormalities in Passage of Urine.—As pointed out before, there is generally more or less discomfort attending the making of water for a few days after labour. But there may be absolute inability on the part of the patient to retain her urine as the result of paralysis of the neck of the bladder from pressure in the labour, or from over-distension of the bladder, or from a "fistula." More commonly we find retention of urine caused by the nervous condition of the patient, especially after a torn perineum has been stitched up, when the passage of water causes more pain than usual. Warm cloths over the vulva will help, but if the water be not passed in ten hours it must be drawn off by a catheter. Frequency of making water may be a minor complication, due to some irritability of the bladder or actual inflammation, the former being treated by a mixture of buchu and hyoscyamus internally with plenty of demulcent drinks.

Complications due to Disorders of Lactation.—Under this category we have the failure of the breasts to secrete milk ; the opposite condition in which the breasts secrete an excess of milk ; fissures or cracks of the nipples ; and the more serious complication of an abscess in the breast.

Absence and Excess of Milk.—In a good many cases it

turns out for some reason or other that insufficient milk is secreted by the breasts for the proper nourishment of the child. All that can be done in such cases is to endeavour to assist that secretion by giving hot drinks to the patient with plenty of milk to herself. Drugs will not assist much. The opposite condition is also a source of trouble and annoyance, namely, an excessive secretion of milk, which in these cases is poor in its quality but great in quantity. It is exhausting to the mother and not good for the child. The mother will soon show general signs of exhaustion if there be this excessive breast activity. She will have headache, sleeplessness, will become thinner and more anæmic, and suffer from palpitation, so that it becomes necessary to check the secretion of the milk. This may be done by a belladonna plaster applied to the breast (six inches by six inches), or better still—because much less discomfort is attached to it—a mixture of tincture of belladonna in lanoline (one drachm to one ounce) may be smeared on the breasts daily. A saline purge should be given every second morning. Very little fluid must be taken in the diet. Should the breasts become very full and painful, the milk must be drawn off by means of a breast pump.

Fissures or Cracks of the Nipples.—These form an unimportant complication as far as danger goes, but they give rise to such intense pain to the mother that every precaution should be taken to prevent their occurrence. The patient will be unable to bear the suckling of the child directly, so a shield for the nipple must be used. After every attempt at suckling the nipples must be carefully washed and dried.

Abscess in the Breast.—This is a very unpleasant complication of the puerperal period, and may occur at any time in that period. It is due to the entrance of septic organisms into the substance of the breast, often through the cracks and fissures above mentioned. The symptoms are shivering fits with feelings of chilliness; great pain in the breast, which increases; rapid pulse and rising of the temperature. On feeling the breast hard portions will be noticed which are very painful when touched, and if the abscess is near the surface the skin over it will be red and hot. The treatment is first of all to keep the patient at rest, take away the child, and support the breasts by a flannel bandage to take off their weight. The pain may be relieved by opiates, the breast gently rubbed with warm oil after being emptied by the breast pump. If a large part of the breast seems to be involved, the secretion of milk must be checked as soon as possible by the means suggested above. When the abscess is actually formed the matter or pus must be let out by the surgeon making a free cut

into the abscess, not at all a serious operation, and one which gives immediate relief from the great pain caused by the pent-up matter.

Grave Complications of the Puerperal Period.—The more serious complications which we shall briefly deal with here are the following :—Puerperal fever, the condition known as *Phlegmasia alba dolens*, or white leg, inflammatory affections of the reproductive organs, peritonitis, and puerperal insanity.

Puerperal Fever or Childbirth Fever.—This is an acute infectious disease occurring in childbed, produced by the entrance of special microbes through some abrasion of the genital tract, by which they gain entrance into the lymphatics or the circulation of the patient. The disease is eminently contagious, a truth that cannot be too much emphasised. In lying-in hospitals once a case occurs the disease may spread with dreadful rapidity and terrible results, the infection being carried by the attendants, sponges, bed-clothing, instruments, and anything which has been in contact with a case. Microbes are the exciting cause of puerperal fever, but they are only able to do their death-dealing work because the patient at this time is particularly susceptible to their action. Women in their first labours seem especially liable to the infection, and, of course, the more complicated the labour, the more likelihood is there of the germs gaining entrance. It is the danger of puerperal fever which is the great reason for the use of antiseptics in labour. If the entrance of the germs of infection can be prevented, there is no danger of puerperal fever occurring. The disease is not nearly so common nowadays as it was fifty years ago, simply because this truth is realised and precautions taken accordingly.

Symptoms of Puerperal Fever.—The disease makes its appearance in many forms, some of which are comparatively mild, others of which are terribly fatal. It shows itself usually a day or two after labour, perhaps a week afterwards. Some patients will have a number of rigors or shivering attacks, others will have one only. In the graver forms the initial chill is earlier and more marked, and signs of high fever and inflammation become rapidly prominent. The temperature rises, though it may fall again in a most deceptive way, only to return. The temperature may be raised in the evening only, and normal in the morning, especially if there be an inflamed condition of the cellular tissue of the pelvis. In the general infection of the circulation by the germs, sudden and intense shivering occurs lasting a long time, this being accompanied by a high fever and most profuse sweating. Later, abscesses may develop in the liver and lungs especially. When the germs infect more particularly the lymphatics, the result is septic inflammations of

the serous membranes of the lung, heart, joints, and the membranes of the brain. The pulse rate is increased to 120 or even 160 per minute, the temperature rising to 102° up to 106° F., with marked falling from time to time. The bowels will be loose at times and then costive. The tongue appears very dry, red, with cracks on its surface. There may be delirium quite early in the fever, which passes off. The course run by the disease is either that of a slow tedious recovery, or death in a few days; most commonly about the third week, or even after many weeks.

Treatment of Puerperal Fever.—This being an acute infectious fever, the treatment must first of all be directed to destroying as far as possible the germs at their seat of origin. Thus if there be some septic condition of the womb, that will be the source of entrance, and the treatment will be directed to that spot. Antiseptics will be used freely. When once infection has occurred, as in all fevers, the attention must be directed to strengthening the patient by every possible means, so that she may withstand the attack of the organisms, and eventually overcome them by her own powers of resistance. Stimulants must be given, and the food must be such as contains the most nourishment in a concentrated form. Then the symptoms call for treatment. The fever and high temperature will be treated by drugs such as quinine and antipyrin. The latest effort to combat this condition is the introduction of an anti-serum, which in some cases has apparently been of great service. If abscesses form, they of course call for urgent surgical interference.

White Leg, Phlegmasia Alba Dolens.—This serious complication consists of an inflammatory affection of the veins of the leg, associated with great swelling of the limb, and general symptoms. It comes on usually during the second or third week after labour, rarely earlier, and occasionally a good deal later. It is not absolutely a disease of the puerperal period, as it may occur during pregnancy, but does not commonly do so. It is due to the process of "thrombosis" or clotting in the veins, beginning in those in the wall of the womb, and causing a secondary inflammation of the veins of the leg. One or both legs may be involved; if one only, it is usually the left.

Symptoms of White Leg.—The leg is painful and swells, it is tense, whitish, and shining. The veins may be felt by the hand as hard and knotty, and are extremely painful to the touch. Some of the most superficial ones stand out as distinct red lines. The pulse is rapid (120), and the temperature rises, especially in the evening. In the course of ten days or so the acute pain and tension disappears, and the leg is softer, pitting on pressure. The swelling does not entirely disappear, however, before six weeks at the earliest, and it

may persist very much longer, many months. It tends to return on the slightest exertion on the part of the patient. As a rule, there is a complete restoration to health, but some glands may have abscesses form in them, and a portion of clot from a vein may cause serious trouble by becoming detached and entering the circulation.

Treatment of White Leg.—The patient must be kept entirely at rest as long as the condition is acute. The pain in the leg may be relieved by rolling a hot water cloth sprinkled with laudanum round it, covering the cloth with mackintosh. The temperature will be dealt with by quinine and other drugs. Later, when the acute stage is over, the leg may be bound in cotton wool and a flannel bandage to promote absorption by pressure. It is dangerous to rub the leg, as a portion of clot may in that way be detached.

Inflammatory Affections.—Apart from puerperal fever and white leg, there are a number of inflammatory affections of the reproductive organs and the tissues surrounding them which may be mentioned. The parts liable to inflammation are the vagina and vulva, the womb itself, the cellular tissue in the pelvis, and the peritoneum or lining membrane of the abdomen. Inflammations of the vagina and vulva are characterised by discharge and swelling of the parts, with burning pain on passing water. Treatment resolves itself into syringing the vagina three times a day with an antiseptic solution, the condition usually being cured in a week.

Inflammation of the Womb.—This more serious condition, when confined to the superficial layers of the cavity of the womb, is termed "endometritis"; if it affects the whole thickness of the wall of the womb it is called "metritis." The Fallopian tubes, from their intimate connection with the womb, are usually involved in the inflammation. The symptoms are tenderness of the womb on pressure, a purulent bad-smelling discharge, and the absence of the proper decrease in size of the womb after labour. The treatment consists in applying hot fomentations over the womb, washing out the cavity with antiseptics, repeating this according to the effect produced.

Inflammation of the Cellular Tissue.—This condition is termed "Pelvic Cellulitis," and it may result as an extension of the inflammatory process from the womb to the tissue around. There is pain usually but it varies, usually a chill which may be slight; the bladder and bowels are painful in their actions, pulse is rapid, the temperature frequently normal in the morning and elevated in the evening, and a local tender area. Most cases subside in a week, a few last a fortnight; whilst if the feverish symptoms continue longer it usually means that there is an abscess forming. In the acute stage the treatment is absolute rest in bed, hot fomentations over the

inflamed part, the bowels kept freely open, and opiates to relieve the pain.

Peritonitis.—Inflammation of the lining membrane of the abdomen or peritonitis may be restricted to one part, or it may involve the whole of the peritoneum. The former is termed local, the latter diffused. It is caused by a spread of the inflammatory process from the womb, the Fallopian tubes, or from the cellular tissue. The symptoms are those of peritonitis occurring in non-puerperal cases, and the treatment is also similar to that in ordinary cases of peritonitis.

Puerperal Insanity.—This distressing complication is responsible for about 10 per cent. of all the cases of insanity which occur in females. It includes the insanity of pregnancy, puerperal insanity proper, and the insanity of lactation. Of these three forms the relative frequency is stated as follows: During pregnancy, 18 per cent.; during puerperal period, 47 per cent.; during lactation, 35 per cent.

Insanity of Pregnancy.—This takes the form either of mania or profound melancholia, the latter being the more common type. It occurs chiefly in elderly women who are pregnant for the first time. As a rule it does not make itself evident before the fourth month of the pregnancy, but once begun it continues generally until after the birth of the child. The outlook is fairly good for the patient; as many as 70 per cent. of cases recover within six months after delivery, but seldom before delivery.

Puerperal Insanity Proper.—This may also manifest itself as mania or melancholy, but, unlike the former type, it is generally mania that supervenes. It is considered to be puerperal in origin if it comes on within a month after the labour. As a matter of fact, the mania usually comes on in the first fortnight or so, the melancholy type of insanity appearing at a later time. The causes appear to be a hereditary tendency to insanity, great exhaustion from difficult or complicated labours, the fear of exposure in the case of the birth being an illegitimate one, and simple fright. The warning symptoms are restlessness and sleeplessness, especially the latter. The pulse is rapid and the temperature raised; and then appears a very peculiar symptom, namely, a marked dislike or actual hatred of the patient's friends, attendants, and even of her own child. The actual signs of the mania when developed vary much. It may begin with a sudden noisy delirium. The melancholia type comes on as a slow growing depression of mind, along with curious morbid delusions and a tendency to suicide.

Insanity of Lactation.—As a rule this is a melancholia. The causes are the same as above-mentioned, and, in addition, the exhaus-

tion attendant upon excessive milk secretion. The outlook is not so good here, some 12 per cent. becoming permanently affected.

Treatment of Mania and Melancholy.—In mania, sleep must be procured by doses of 20 to 30 grains of chloral at bedtime. Plenty of food and exercise should be given, but no stimulants unless there is great weakness. If possible, the patient should be treated in a private house rather than in an asylum. In melancholy, sleep must be obtained, and food *and stimulants* given freely, and treatment is best carried out in an asylum. Constant watching of the patient is necessary; and in those most painful cases in which the patient develops dislike and hatred of those nearest and dearest to her, it is obvious that she must be removed from their presence, as much for her own good as for their relief. The child must, of course, be removed at once, and it may be necessary to compel the patient to take food. In addition to this, the mere change of air and surroundings is always a help to recovery in these cases. It should always be remembered that subsequent pregnancies are apt to be followed by a return of the insanity, even if it has been temporarily recovered from. Not only so, but the second attack will in all probability be worse than the first. There are no complications of pregnancy or the puerperium more heartrending than those of insanity in a young mother.

SECTION IV

NATURAL LABOUR

Natural Labour and its Management.—We now enter upon a portion of our subject the importance of which it is impossible to exaggerate, for the good and time-honoured reason—as true to-day as it always has been and ever will be—that the hand which rocks the cradle rules the world. It is an undoubted if regrettable fact that in some countries, and to a certain extent in our own, there are signs that modern women are more and more tending to shirk the duties and responsibilities which the bearing of children inevitably involves, but children must and will be born, and amid the stress and competition of modern life it is more necessary than ever it was for women to understand clearly how much depends on their general behaviour and their treatment during and after pregnancy. Unfortunately, just because the birth of a child is a

necessary and natural process, there is a widespread belief that no special precautions need be adopted. Nature, it is thought, will see that all goes well. It is something to be profoundly thankful for, that in a great many cases all does go well, in so far as the child is born healthy and the mother survives the pain and peril of childbirth. But that is not all that is to be desired by any means. In a *natural* childbirth the danger to the child begins at the moment of its birth, and any careless or ignorant treatment at that time may bear results throughout the whole of its future life, and indeed may prejudice the continuance of that life altogether. Nothing is more lamentable than that in this twentieth century so many hundreds of children should be born only to perish in the first few months of their infantile existence, chiefly as the result of improper feeding and lack of attention from those in whose charge they are. It may be true in some matters that a little knowledge is a dangerous thing; it is equally true that in the care of infants a little knowledge on the part of the mothers of our land would save thousands of valuable lives. At any rate it is one of those paramount duties concerning which even a little knowledge is infinitely to be preferred to entire ignorance. So with regard to the mother. Numbers of young and healthy mothers are handicapped for the rest of their lives simply from lack of a little simple information as to the care of themselves during, and just after, their pregnancy. We are not now referring to difficult cases of labour; what we desire here is to impress strongly upon mothers and those who look after them, that some care, some thought, some precautions are absolutely necessary even in the most natural labours, if all is to go well with mother and child.

One other point we would remark upon. A great number of cases of labour are never seen by a fully-qualified physician. As a matter of fact, there is no situation in life in which the services of a physician and his skilled advice are more wanted than in the lying-in room, and we would advise all who can to secure the services of their doctor for confinements. Infinite harm is done to both mother and child in many cases by waiting too long in the hope that matters will come all right. But since all cannot, and some will not, secure medical attendance in these cases, the next best thing is that those responsible for the management should take pains to make themselves familiar with what they may be called upon to do and how to do it. It is for these persons that we are now about to describe natural labour and its management. What we have to say here should be read in conjunction with other sections of this work which deal with the signs of pregnancy and other matters treated of elsewhere in this volume.

Definition of Labour.—By the term “labour” is meant the expulsion from the womb of the contents of that organ. The same meaning is attached to the term “confinement,” and the process is also called “parturition.” All these mean the same thing. It is a natural and physiological process which takes place at a definite time after conception, but it is a process so complicated that it takes very little to convert a simple natural or normal labour into a difficult abnormal labour. It is for this reason that it is so important to recognise at once the onset of any unusual symptoms.

Labour is not equally difficult in all women. The higher the civilisation of the race the more difficult is the process, and even in the same nation labour is more difficult amongst the higher classes of the community than in the lower. A natural labour is also attended with more difficulty and danger if the child is a male than if it be a female, simply because male children are larger than females.

Symptoms preceding the Onset of Labour.—We have dealt with the signs of pregnancy elsewhere, and will now presume that the patient is expecting her confinement daily. In the human female the date of the confinement will be about two hundred and eighty days counting from the first day of her last menstrual period, or rather that will be the average length of the duration of pregnancy. All the general arrangements should be completed at least a week before the confinement is expected and everything in readiness, so that nothing is left to chance at the last moment. (See pp. 125-127.) This is of the greatest importance, because there *may be no premonitory signs or symptoms to indicate the immediate onset* of the labour. It often begins without a moment's warning. But some points may be noted which will be found to occur during the weeks immediately preceding the labour. The swelling of the abdomen, which is caused by the womb and the child within it, sinks lower down, the result of which is to allow the breathing of the patient to become easier, and her movements in walking more difficult. Then there is often a desire to pass water frequently and a sense of pressure on the last part of the bowel. There may be an increase of the secretion from the vagina, what is called “shows.” Often the patient has “false pains”; false because they do not mean the commencement of the actual labour but are caused by constipation, errors of diet, or over-fatigue. These should be treated by emptying the bowels, preferably by an enema, and by rest on the part of the patient. All these premonitory symptoms, which need give rise to no anxiety and which indeed only indicate proper activity, are eventually followed by the onset of the “true pains” which herald the actual process.

Before Labour.—During these last weeks the patient should be most careful to take gentle walking exercise daily, avoiding over-fatigue, to keep to a plain and nourishing diet, to remain as free from worry, anxiety, and excitement as her condition will permit, and to see that she gets plenty of fresh air. Above all, alcoholic stimulants should be avoided. As far as possible she should live her ordinary life, meeting the other members of the household at meals, and engaging in general conversation. Everything should be done to prevent the mind constantly dwelling upon the impending trial, as in this way the patient's strength is best maintained for what is under the most favourable conditions a severe strain.

The Mechanism of Natural Labour.—Before we undertake the consideration of the management of a case of labour, it is necessary to say something about what we may call the machinery or the mechanism by means of which the process is completed. It will be convenient to discuss this under the following headings:—(1) The factors concerned in labour; (2) The “presentation” of the child; (3) The various stages of the labour. We will take these aspects in order.

i. The Factors of Labour.—The causes of labour are those which bring about the emptying of the contents of the womb. They are either primary or secondary. The primary or first cause of labour is to be found in the onset of the “uterine contractions,” as the movements of the muscular womb are called. The womb, it will be remembered, is a hollow muscle, in the cavity of which the developing child or foetus is carried during pregnancy. The natural function of muscular tissue is to contract under suitable stimuli, and when the uterus contracts it drives out of its cavity the contents therein, namely the child and its membranes. Inasmuch as the outlet of the uterus is very narrow, a mere tube before labour commences, it follows that the resistance to be overcome before the contents can be expelled is very great, and the passage has to dilate to allow the child to escape, and this is a very gradual process, only attained after a large number of contractions have followed one another at regular intervals.

The secondary factors in the process are muscular contractions other than those of the uterus which aid in the expulsion of the child by increasing the pressure, and in addition the weight of the child itself has to be considered as an additional factor. Of these factors the primary are by far the most important and must be further considered.

Labour Pains.—The successive contractions of the uterus in their effort to drive out the child cause great pain to the patient

because of the resistance offered by the narrow outlet of the womb, hence these muscular contractions have received the common name of "labour pains." Moreover, after the outlet to the uterus has become sufficiently wide to admit of the passage of the child, there is still considerable resistance to be overcome in the other passages which have to be traversed, and the gradual dilatation of all these passages is attended with pain.

The contractions of the uterus come under the class of "involuntary muscular contractions"; that is to say they occur quite independently of the will of the patient, she cannot control their onset in any way. (A voluntary contraction is one which is the result of a message sent from the brain to a muscle at the will of the patient.) Labour pains therefore are involuntary muscular contractions. They are also intermittent in character, not continuous, a shorter or longer interval occurring between each pain. The character and the periods of intermission vary at the different stages of the labour. In the early stages the pains are less severe but more continuous, following each other with rapidity; and they are often described by patients as "cutting" or "grinding" in character, *i.e.* sharp pains. As the labour proceeds they alter their character and become stronger, each pain of a longer duration, and are described as "bearing-down" pains. They are associated at this stage with the secondary factor of the contraction of the muscles of the belly wall, which the patient herself largely controls. The fact that these labour pains are intermittent is a great gain to the patient, since it gives her the opportunity to rest and gain strength before the next pain comes, thus preventing her becoming utterly exhausted. It also allows of the blood circulating in the child, which is stopped during a pain from compression of the vessels which supply it with blood.

The Patient in the Early Stage.—During the first stage of the labour the patient need not be lying down all the time, even though some pains are apparent. The pains are usually stronger if she is up, and the stronger the pains the more is the labour advanced in a natural case. Sooner or later the "waters" will rupture, and the patient should then be put to bed if she be up when that occurs. At first the true labour pains come on at intervals of half-an-hour or so, then as the labour advances the time of intermission lessens, and the pains occur every fifteen minutes, every ten minutes, every five minutes, and even at shorter intervals than this, every three or four minutes.

Effects of Labour Pains.—As above explained the first result of these uterine contractions is to dilate the lower part of the womb. As this lower segment stretches, the membranes within

which are attached to it become separated, and are driven through the opening of the uterus, where they can be felt, forming the "bag of membranes," or the "forewaters." They act as a wedge or dilator which gradually opens up the outlet of the womb (the neck of the uterus or cervix). As a rule this bag is rounded in shape, but may project in the form of a sausage. The pressure causes the bag to be very tense during a pain, and at last becomes so great that the bag of waters bursts or ruptures, and the forewaters escape. What is seen is the rush of a varying amount of straw-coloured fluid during a pain. This rupture of membranes is a very variable phenomenon. Sometimes it occurs very early in labour, even before the pains are well marked, at other times it is much delayed from the toughness of the membranes, so much so that they have to be ruptured artificially. It occasionally even happens that the child is born without the membranes having ruptured at all, in which case the membranes are found to envelop the child. This accident demands prompt interference, or the child will be unable to breathe. The membranes must be ruptured at once. At other times the child is born with the membranes over its head; what is called a "caul." This has been the origin of some quaint superstitions, the caul being valued for various purposes, amongst which may be mentioned the belief held by some old sailors that the possession of a caul is a security against being drowned. The result of the rupture of the membranes is to allow the head of the child to enter the outlet of the womb, for which they have been preparing the way. The head itself then acts as the dilating wedge, and gradually forces the uterus to open to an extent sufficient to allow the head to escape. The body of the child can then follow, as the head has the greatest diameter. The final result is the expulsion from the womb of the whole child. The pains become stronger and stronger and come at shorter intervals, and the suffering is comparatively greater. Finally, when the child is about to pass out of the last portion of the passages, the pain is so severe that the patient frequently loses entire control over herself, and may exhibit some violence. To sum up in a word, then, the result of the labour pains is to gradually dilate the various passages through which the child has to pass before birth is complete. The nature of these various passages is dealt with in another part of this volume.

Effect of Pains on the Child.—But there is another aspect of the effect of the uterine or womb contractions, namely, the effect upon the child. As long as the membranes remain intact and the waters have not escaped, the child does not suffer from pressure effects; but once the waters have escaped, the pressure is then exerted directly on the body of the child and produces certain marked

changes. In a natural labour these effects are of two kinds : First there is the effect upon the shape of the child's head, due to "moulding" on the part of the bones of the skull. This is simply due to the fact that these bones are loosely united and move with the pressure ; the result is that in all cases in which the head comes first, as it does in most labours, the head is found to be slightly out of its proper shape, somewhat asymmetrical. One side will be bigger than the other. The more difficult and the longer the labour the more marked will this moulding be. It is a natural effect which soon disappears. Another effect upon the child of the pressure of the labour pains, and one which is apt to cause worry and anxiety to the inexperienced mother, is the appearance of a swelling on the scalp. This swelling is on that part of the head which "presents" first. It is known in technical language as the "caput succedaneum." It arises simply because the part of the head which comes first is not supported, it lies free, the pressure therefore forces the serum of the blood into it, and gives rise to the swelling. This somewhat uncouth appearance disappears in a few days, and need cause no anxiety.

2. The Presentation of the Child.—Next to the pains themselves as a factor in labour comes the "presentation" of the child, a matter of the greatest importance. The meaning of the term is that part of the child which can be felt upon examination to be lying over the mouth of the uterus. Thus, if the head lies over the uterine outlet, it is termed a "head presentation," the head is said to "present" first. This must be distinguished from the "attitude," which means the relation of the different parts of the child to each other, the usual attitude of the child being one in which it is bent upon itself (flexion). The "position," on the other hand, means the relation which the presenting part bears to the pelvis of the mother. Now in a natural labour—which alone we are considering at present—the head or vertex presents, and the labour is over within twenty-four hours ; that is the definition of a natural labour.

This vertex presentation of the child occurs in about 96 per cent. of all cases of labour, a fact which should remove some anxiety from the minds of those called upon to go through or manage a confinement in such circumstances as prevent the securing of skilled assistance. The precise limitation of the "vertex" is that portion of top of the head which lies between the two membranous spaces formed by the bones not meeting. These two spaces are termed the "fontanelles"—one in front, the anterior ; one behind, the posterior. Any portion of the top of the head between these spots, when it comes to lie over the neck of the uterus, constitutes a "vertex presentation." This forms the second factor in the mechanism of a labour.

3. The Stages of a Normal Labour.—It is necessary now to indicate the various stages which are recognised in a natural labour; they follow naturally upon what has been already said. We consider that a labour consists of three stages.

The First Stage is the period of dilatation, or preparation for the actual birth. It may be considered to begin with the onset of the true labour pains, and to end with the mouth (os) of the uterus, the outlet, that is, is fully dilated.

The Second Stage begins, of course, where the first ends. It commences with the full dilatation of the mouth of the uterus (os uteri), and ends with the complete expulsion of the child; when the child, in fact, is born.

The Third Stage begins after the birth of the child, and ends with the expulsion of the after-birth or placenta, and the membranes. It is, in other words, the stage of detachment and expulsion of the *after-birth* (or placenta) and the membranes.

The Exact Mechanism of Labour.—The more technical aspects of the mechanism of labour must now be briefly described for the benefit of special readers, and to understand what follows in this paragraph the reader is first of all referred to the description of the anatomy of the parts of the body concerned, which will be found on a preceding page. The movements of the presenting part of the child must be grasped in order to clearly understand the mechanism, and since we are dealing with vertex presentations alone we shall note these.

The head may present in four different positions. In each case it is the occiput (or back of the head) which leads the way, and gives the technical name to the presentation, it is therefore called the "denominator." The four positions occupied are recognised as first, second, third, and fourth, according to the manner in which the occiput points.

The "first position" is the most frequent of all. In it the occiput points to the left hip-joint or acetabulum. The forehead of the child points to the right sacro-iliac joint. The whole position is termed left occipito-anterior (L.O.A.) and occurs in 65 per cent. of cases.

The "second position" is that in which the occiput points to the right instead of the left, and the forehead to the left instead of the right. It is called right occipito-anterior (R.O.A.). This occurs in 10 per cent. of cases.

In the "third position" the occiput points towards the right sacro-iliac joint, and the forehead to the left acetabulum. It is thus exactly the reverse of the first. It is called the right occipito-posterior (R.O.P.), and occurs in 20 per cent. of cases, being the second most frequent.

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The "fourth position" is the reverse of the second, the occiput pointing to the left sacro-iliac joint, and the forehead to the right acetabulum. It is a rare position, occurring in only about 5 per cent. of labours. It is termed left occipito-posterior (L.O.P.).

The Normal Position.—The first position being so much more common than the others is therefore called the "normal" one, and we shall briefly note the movements of the head in that position. The head is somewhat bent or flexed on the chest, and enters the pelvis of the mother ("engages in the brim," as it is called) in the position described above (L.O.A.). The contractions of the uterus drive the head forcibly downwards and backwards through the cavity of the pelvis, constituting the first portion of the movement of "descent," a movement which goes on through some time. When this descent begins the head, meeting with resistance, becomes more and more bent or flexed. "Flexion" is increased to such an extent, indeed, that the occiput gets a good deal in advance of the forehead. The result of this mechanical movement is very important; it replaces a long diameter of the head by a much shorter one, thus allowing of the more easy passage of the head. The more marked this movement of flexion is, the more facility is there for the head to pass down. After the bent head has passed down through the cavity of the pelvis the occiput which is coming first comes in contact with the pelvic floor or the perineum. The occiput, as the consequence of the resistance met with in this position, now turns forward, giving rise to the movement of "internal rotation." It turns towards the right under the pubic joints. It is the only direction in which it can go, forwards to the opening of the vulvae. The head now becomes caught under the pubic symphysis by the nape of the neck, and then comes the next movement—that of "extension." It is the undoing of the flexed position; the chin gradually is lifted from the chest until the head is thrown back. "In this way the top of the head, the forehead, and then the face of the child, is forced over the perineum, the back of the neck slips round the symphysis pubis, and the head is born."

The Actual Birth.—"The head turns round so that the face of the child, which was looking directly towards the mother's anus, comes to look towards her right thigh or towards the ceiling, when the patient is lying in the usual position on her left side. The head has nothing to do with causing this. It is caused by the leading or right shoulder passing forward under the pubic symphysis, just as the occiput did, but in the opposite direction—viz., towards the left. The right shoulder gets caught under the symphysis, and the left one sweeps over the perineum, and the shoulders and arms are born. The

body is then expelled without any difficulty, as a rule." So that the mechanism of the labour results in the following movements in order: Flexion, descent, increased flexion, internal rotation, extension, and finally external rotation and complete birth of the body.

The Third Stage.—It remains to add a word concerning the mechanism of the third stage, that in which the placenta and the membranes are expelled. The placenta, or after-birth, which is the medium of attachment between the mother and the developing child, is circular in shape, about the size of an ordinary soup-plate, some seven inches across, and from one to one and a half inches thick, weighing about a pound and a half. From its edges the membranes come off, and after expulsion in the third stage care must be taken to ascertain that the whole placenta and membranes have been passed out. Before the child is born the placenta is attached to the wall of the uterus, but when the child is driven out, the cavity of the uterus is so diminished in size that the site of attachment of the placenta gets less also. With each contraction of the uterus in the third stage that organ becomes smaller, but the placenta cannot get less in size, so it is bound to separate from its site of attachment since that is no longer its former size. The membranes similarly separate. Finally both afterbirth and membranes are completely separated from their uterine attachments and lie free in the cavity. Further contractions drive them out of the uterus into the vagina, and from thence they are expelled by the contraction of the abdominal muscles, their appearance being accompanied by some clotted blood. It often happens that after the placenta and the membranes have reached the vagina they lie there for some time before being finally expelled from the patient, owing to the fatigued muscles not contracting sufficiently. This need not occasion anxiety; they will be passed out sooner or later, so long as they have left their attachment in the uterus itself. That is the important point.

The Management of Natural Labour.—We now come to the more important part of our subject from the practical point of view—how to manage a case of natural uncomplicated labour. It has been already explained on a previous page what is required as regards the arrangement of the bedroom of the patient, and all the various nursing points that come up for consideration have been dealt with. Nothing more, therefore, need be said here on these matters; but there is one subject on which it is necessary to say something at the very outset of this section, because perhaps more depends upon it than upon any other part of the management of a labour which is in the hands of the non-professional attendant. We refer to the use of antiseptics.

Antiseptics.—We have not the slightest hesitation in saying that a thorough knowledge of antiseptics and their uses is by far the most important equipment that can be possessed by the non-professional attendant upon cases of labour. It is an absolutely vital matter, and it is so simple that there is no excuse for ignorance on this point. There are no difficult technical details to be mastered, no complicated apparatus to understand; a few minutes' careful thought and reading will ensure a grasp of the main principles of antiseptic methods, and be the means of protecting the patient from the only serious risks attending a case of natural labour.

Mortality in Labour.—We have not to go very far back in the history of midwifery to find what an appalling mortality was formerly associated with the lying-in room, especially in maternity hospitals and places where a number of cases were treated under the same roof. Cases of puerperal fever were common in both private and hospital practice, and epidemics were common in both. It was no unusual occurrence for a hospital to be closed on this account, and some were even pulled down because of the apparent impossibility of freeing the building from the terrible danger of the infection. The nature of the disease was not known until some fifty odd years ago; it was supposed to be a fever like smallpox, but its exact cause and the way in which patients became infected was unknown. That was before the days of the science of bacteriology. When it was shown that puerperal fever was caused by the entrance of germs into the genital tract, the only problem that remained in order to stamp out the disease was to discover some method which would render such a mode of infection impossible. That method was found in antisepsis, or the use of antiseptics.

Antiseptics in Midwifery.—At the present time the medical man who has a case of puerperal fever amongst his cases of labours goes about with a guilty conscience, or else has to bear the burden of gross ignorance or carelessness on the part of some one in attendance upon the case. We therefore urge upon all who have to be in the lying-in room the grave and urgent importance of paying attention to this subject. We shall have to deal more fully with the results of neglect of antiseptic precautions when we come to the diseases of the patient after birth. The inestimable boon of antiseptic treatment we owe to Lord Lister, who used for this purpose at first solutions of *Carbolic acid*, a substance still largely employed. The pure acid is far too strong, and so a lotion of varying strength is made by diluting in water. The usual strengths are: For the hands of those in attendance, 1 part of carbolic acid in 20 of water, or, what comes to the same thing, 1 ounce in a pint of water; for making a douche to

wash out the passages, a strength of 1 in 40 is used. For various reasons carbolic acid is inferior as an antiseptic to some other preparations.

The Best Antiseptics.—*Corrosive sublimate* (perchloride of mercury) is perhaps the most reliable and powerful of the common antiseptics. It is a poison, and must be used with every care, and should be always conspicuously labelled. So strong is the action of this substance as a killer of germ life, that a strength of 1 in 1000 of water is sufficient for the hands. Even this is too strong to be used safely as a douche, 1 in 2000 being quite as strong as is safe. The perchloride of mercury may form a deposit on a raw surface and thence become absorbed, giving rise to poisoning symptoms; and so it is wise to follow a douche of this antiseptic with one of water which has been sterilised by boiling, which will wash off any deposit. A non-professional attendant should never use a corrosive sublimate solution stronger than 1 in 4000. Care must be taken that no metal instruments come in contact with the solution, or the metal will be destroyed. It must be prepared and kept in glass or enamel vessels. A very convenient form of this antiseptic, as of most others, is that made as a tabloid, but great care must be taken to keep the tabloids out of the reach of children and others who may be unaware of their nature. To swallow one intentionally or by accident would entail a *fatal result*.

Boracic acid in solution is a non-poisonous antiseptic, but is not a very powerful germicide. The same remark applies to *Condy's fluid*, a non-poisonous weak antiseptic.

Of more recent antiseptics may be mentioned *Creolin*, used in the strength of 1 in 300 (half a teaspoonful to a pint of water); *Lysol*, in strength of 1 in 100, a very useful solution for lubricating hands or instruments, as it is slippery, and so may obviate the use of vaseline or oil, which sooner or later becomes septic; and lastly *Izal*, in a preparation of 1 to 200 of water.

As a disinfecting powder, *Iodoform*, either alone or in combination with powdered boracic acid, is a strong antiseptic. It is useful for dusting over raw surfaces, and impregnating various dressings such as cotton wool, gauze, and lint.

All the above are means to one end, namely the carrying out of the antiseptic method of treatment, the object of which is to kill any microbes which have found their way into a wound, and to protect it from further contamination.

The Aseptic Method.—A further development of our knowledge of bacteriology has been the introduction of what is called the aseptic method, which aims at prevention rather than cure. The

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whole object here is to prevent the possibility of any microbes *entering* the wound, and therefore to do away with the necessity of destroying them. When this can be done with absolute certainty it is doubtless the ideal method, but in midwifery practice it is almost too much to expect from untrained persons. It means that the whole field of operations must be rendered aseptic, free from germs, to begin with, and then kept in that condition from the beginning of the confinement to the end of the period of lying-in. To do this requires great thoroughness. Take the hands for example. To render the hands aseptic they and the forearms must be bared to the elbows and scrubbed first with warm water and soap by means of a clean nail brush. The nails themselves must be short. The hands and arms are then rubbed with turpentine which takes away the grease. This is washed off with methylated spirits, and then the hands and forearms are immersed in a solution of 1 in 1000 of corrosive sublimate. It must be remembered that if any ordinary article in the room be now touched, the hands will become septic once more, and they must be placed again in the antiseptic solution. The turpentine and methylated spirit part of the process is usually dispensed with in routine work; a careful washing with soap and water followed by the application of the antiseptic is sufficient.

How to Render Instruments Aseptic.—Next as regards instruments and other apparatus or utensils. These can be rendered aseptic by boiling them, so long as they are not made of materials which would be injured by boiling.

How to make the Patient Aseptic.—Then there is the patient herself, or those parts of her which are involved in the danger from infection, namely the external genitals, the vagina, and the uterus. The external genitals are septic, just as any other surface exposed to the atmosphere is; but the secretions of the vagina and the uterine cavity itself under normal conditions do not contain germs which will give rise to mischief. So long then as nothing septic is introduced into the vaginal passage or into the uterus, there is no fear of septic danger arising from these situations in a healthy case. The external genitals, however, must be carefully sterilised so that there may be no risk of the germs there entering within. The buttocks and genitals must be washed with soap and water followed by an antiseptic solution such as Lysol. The vulva also must be carefully cleansed with swabs of cotton wool soaked in the antiseptic, and if these precautions are thoroughly attended to, and there be no interference in the shape of vaginal examination or other access to the passages from the exterior, there will be no risk of sepsis supervening in a normal natural labour. We repeat, however, that it is

difficult to carry out the aseptic method thoroughly in many conditions of life, and the antiseptics should always be available and used freely if necessary. Having appreciated the enormous importance of cleanliness and antiseptic methods in all that is done in the lying-in room, we may now proceed to consider the management of the actual labour itself, taking it in the various stages above mentioned.

Management of the First Stage of Labour.—We are still dealing with a case of natural labour, and therefore the management of the first stage resolves itself into simply doing what is necessary for the comfort of the patient and the furtherance of the natural process. If the patient has been wisely advised she will have had the bowels well opened that day by means of a dose of castor oil or some other aperient, but if this has not been done, then the bowel should be emptied by the administration of an enema of warm soap and water. The bladder also should be emptied of water. Both these processes relieve the pressure and give more room for the natural passage of the child. During this stage the patient may be allowed to walk about the room, as the pains become stronger if she does this than if she lies down from the beginning. She must be told, however, not to “bear down” herself; she cannot do any good yet by voluntary effort, and she will require all her strength in order to be able to help herself in this way later on. It will be understood that during this stage everything must be ready prepared for the arrival of the baby, nothing should be left to the moment of actual birth. Some nourishment should be given to the patient at intervals, and this must be light and plain and above all non-alcoholic. A cup of tea, some beef-tea, or soup will answer the purpose best. Try as far as possible to maintain a cheerful atmosphere about her, but do not make her talk unless she feels inclined. Above all, the discussion and gossip concerning bad cases of confinements which have come under the notice of some one present must be *absolutely forbidden*. It ought to be unnecessary to have to lay stress upon such a matter, but unfortunately this is a most common occurrence especially amongst the poorer classes, many of whom seem to store up all the most melancholy and terrible experiences to retail them to the poor sufferer. It is your first duty to sternly suppress any conversation of this sort. Neither should too many persons be allowed in the room. For one thing it is difficult to control conversation, and for another thing the air of the room should be kept as fresh as possible for the use of the patient, and not vitiated by a crowd of useless onlookers. Two people are all that need be wanted to do all that is necessary in a natural case of labour. From the beginning of the labour to the end there should be continuously available plenty of

hot water. If the above precautions are attended to the first stage will look after itself.

Management of the Second Stage of Labour.—The outlet of the womb has now fully dilated and the bag of membranes has ruptured, the waters have come away. The patient must now take to her bed and remain there until all is safely concluded. For reasons which need not be entered into here, her position should be that of lying upon her left side, it is the most convenient attitude for herself and for her attendants. The time has now come when she can help herself a good deal by voluntarily contracting her abdominal muscles or “bearing down” during the ordinary labour pains which are becoming more severe and more frequent. In fact she should be instructed to hold her breath and strain as hard as her strength will allow during a pain. To assist her in this bearing down a towel should be fastened to the top of the bedstead for her to grasp and pull upon with her hands, and at the foot of the bed some kind of footstool may be placed for her to push against with her feet. During the intervals between the pains she should lie perfectly quiet and rest, reserving all her efforts for the actual time when the pain is upon her. She will now be suffering acutely and may cry out; there will be great pain in the back, which is alleviated by one of the attendants pressing with the palm of the hand against the small of the patient's back. The pressure should be firm. She may also complain of cramp in the legs, which is relieved by smart rubbing over the affected limb. As the head of the coming infant approaches the last part of its journey, a pillow should be placed between the knees of the patient in order to separate the thighs, or else an attendant may support the right thigh in the hands. The most painful stage of the whole labour is now at hand, that during which the head passes over the perineum and distending the vagina is eventually born. As it does so it will probably cause some faeces to be discharged from the anus, which should be immediately wiped away with some wool which has been soaked in Lysol or other antiseptic. In doing this be careful to wipe the parts backwards, away from the vulva, so that the latter are not soiled, and never use the same wool more than once. Some relief will be afforded, especially in cases where the perineum is very rigid and difficult to dilate, by applying warm cloths and some oil to the surface. The cloths should be wrung out in hot water and applied as fomentations. It is thus helped to relax.

The Birth of the Head.—In a good many cases there will be a slight tearing of the *perineum* at the time of the birth of the head; indeed, if it be the first child of the patient this is very common. “When the perineum is tense it is a mistake to hurry the

delivery of the head. You should rather retard it by telling the patient to open her mouth and cry out when a pain is on, instead of holding her breath and 'bearing down.' There is no hurry now, it is only a matter of a few pains more or less—painful enough no doubt, but a little delay at this stage is better than a large tear in the perineum with all its attendant risk and discomfort. "This allows the parts to dilate fully. You should also try to keep the head as much flexed as possible, to bring a small diameter through. To do this, place a pledglet of tow or wool over the anus, which will now be distended, so as to keep your hand from being soiled, and then apply your right hand flat over this with the thumb to one side of the vulva, and the fingers to the other, and push the whole structure forwards, while at the same time your left hand is passed between the thighs from the front, so as to grasp the head with the thumb and fingers, and keep it flexed as much as possible. Never strip the perineum back over the head, or you will be sure to tear it." The head will now be born as the result of a strong pain and a supreme effort on the part of the patient. Be ready to receive the head in the right hand, placing the left over the uterus, which can be felt through the belly wall. At this point prompt action will be required in a certain number of cases. *The cord may be found to be coiled round the neck of the child.* This can be ascertained at once by slipping your fingers over the back of the child's head and feeling whether the cord is there or not. If not, well and good. If it is there, coiled round the neck, it must be freed at once. This can be done simply by slipping it over the back of the head, after pulling one loop of it down a little if necessary. Or after pulling down the loop, the shoulders of the child, which will be born next, may be allowed to pass through the loop. It is perhaps best to slip the cord over the head at once, and so get it out of the way. But you may find that the cord is arranged in such a way, or is so tightly coiled round the neck that it is impossible to set it free in the way just described. In that case there are two courses open to get out of the difficulty. There must be no flurry here; keep your head and wits about you, and just *think*, and all will go well. The first thing which may be done is to tie the cord in two places with twine and cut it, divide it, between the two ligatures. We advise this where the cord is sufficiently slack to allow of the ligatures being put on. Take your time over this, and tie the ligatures securely. But it will be found sometimes that the cord is so tight round the child's neck that it is impossible to carry out this procedure. In that case there is nothing for it but to simply cut the cord with a pair of scissors, being very careful to cut nothing else, and deliver the body of the

child as quickly as possible, so that the end of the cord attached to the child may be quickly tied. Wherever possible carry out the first plan.

The Advantage of Patience.—Do not hurry matters at this stage so long as all is well; the head being born the shoulders and body will follow without trouble, as a rule coming away with the next pain. Whatever you do, *do not pull on the head*. If there is any delay press from the womb, but do not pull. By pressing the child forwards as it is coming through the vulva, you will help to prevent the danger of the posterior shoulder tearing the patient's perineum. As this shoulder is born the rest of the child slips out easily, and the birth of the infant is over. Now, do not think for a moment that attention can be relaxed because the child is born. Hitherto you have been able to do very little towards securing that result; at this point a good deal devolves upon the attendant. In fact, your work really begins. For weal or woe the patient is now in your hands; exhausted by the severe struggle through which she has passed, and incapable for a time of doing anything for herself. Much, both for mother and child, will depend upon the care given at this time.

After the Birth of the Child.—Presuming that there is no excessive bleeding from the mother—an accident which will be dealt with later on—one of the attendants should firmly grasp through the wall of the abdomen the patient's uterus, which will feel during its contractions, which still go on, like a hard cricket ball. The other attendant must look after the child. In an ordinary case the cord must be tied at two places, one about two inches from the attachment to the child, the other some two inches further away. Before dividing it, try and make the child cry out. Usually the child will do so at once, but if it does not, one or two smart slaps on the buttock will bring about the desired result. The object, of course, is to secure a full inflation of the lungs and to start the child breathing. If you feel the cord pulsating strongly, wait until that ceases before tying it. Then, pulsation having ceased, and the child having given evidence of healthy lung power, tie the cord as described, and cut the cord with a pair of scissors between the two ligatures. In doing this, lay the cord across the palm of your hand, so as to avoid any possibility of injuring the child in any part. A linen thread ligature is the best, but any strong thread will answer the purpose. It must be tied tightly enough to prevent any bleeding from the end next to the child. Should there be any bleeding after the cord is cut, apply a second ligature next to the first. A few minutes after the cord has been divided it should always be examined for bleeding. The object

of tying the end which is still attached to the mother is first to prevent soiling of the bedclothes; and secondly, as a preventive measure in the case of twin births, where there may be only one after-birth.

The Child's Eyes and Mouth.—Next turn the attention to the child's eyes, and gently wipe them clean, and at the same time free its mouth from mucus. All this is the work of a few moments, taking almost less time to carry out than it does to describe. Being done, the baby is wrapped in soft warm clothes, which have been waiting at the fireside for it, and the infant is then put safely on one side, while the mother still claims attention.

Management of the Third Stage of Labour.—The patient may find it best in this stage to lie on her back with her knees drawn up, while the attendant firmly holds the uterus and gently kneads it. It will be felt to harden with each contraction, and then relax. After some ten or fifteen minutes the placenta, which is still in the uterus, can be felt to slip out of that organ into the vagina, from which the patient herself can expel it by her own bearing down efforts, or the attendant can expel it by firmly pressing the uterus downwards and backwards. Occasionally, even in perfectly normal cases, the after-birth takes longer to come away, but so long as it does so within an hour of the birth of the child nothing is wrong. Should you find that she herself cannot drive it out of the vagina, and that your pressure does not do so, it is not a difficult matter to get it out. Thoroughly sterilise the right hand, and passing a finger into the lower part of the after-birth, it can be withdrawn without difficulty. The membranes can be withdrawn by twisting the placenta round and round, or simply by grasping them between the fingers and thumb and drawing *very gently* on them. Twenty minutes after the birth of the child both placenta and membranes will usually have followed. They should be placed in a basin of water and floated out so that it can be seen whether they have come away whole and entire or not.

Delay of the After-Birth.—But suppose that the after-birth has not come away in twenty minutes or so? In that case it is possible that its non-appearance is due to defective uterine or womb contractions, which can be stimulated by further kneading of the uterus. Grasp it firmly—you must ignore the patient's resistance, if any—and squeeze it downwards and backwards, and keep on doing this at intervals of a quarter of a minute or so, almost continuously that is, for some time. If there is nothing wrong your labour—and it is tiring work to the hand—will be rewarded. If after half-an-hour of this steady effort the placenta does not come, it must be

adherent to the wall of the uterus, and you must send for medical assistance if possible, for the one caution which must be urged here is this: Never under any circumstances pull upon the cord before the placenta is delivered. For one thing the cord will easily be broken, and for another thing you may possibly cause the uterus to be turned inside out and kill the patient. *Never pull on the cord.*

The Perineum.—After both placenta and membranes have come away satisfactorily, the perineum must be examined in order to see whether or not it has been torn at all during birth, and if so, to what extent. In fact it is well to do this immediately after the child is born, because if there be an extensive tearing it will be necessary to send for medical assistance to have the perineum stitched up, and time will be saved. A very slight tear does not require to be stitched, but if the perineum be torn for as much as half its extent it should always be stitched up, or the patient will suffer for the neglect afterwards. This looking for a torn perineum must be done thoroughly, because it is easily overlooked by an unskilful attendant, who will be blamed later on for serious inconveniences which will supervene.

Cleansing the Patient.—After all these matters have been carefully attended to, the question of cleansing the patient and her surroundings arises, and a very important question it is, because nothing is worse for the patient than to be left in her soiled clothes or to continue to lie upon a bed which will probably be soaked with various discharges and a certain amount of blood. In fact everything must be done to render the patient clean and comfortable with as little delay as possible. First of all the soiled bed-linen must be removed from under her. Then a perfectly clean aseptic diaper should be applied to the vulva; better still, one rung out of a warm antiseptic solution. If possible wood wool diapers should be used for this purpose, but amongst the poor these will not be available. In this case any old soft linen will do so long as it is perfectly clean and antiseptic. In the same way a clean warm draw sheet should be placed under the patient; for those who can afford it it should be a special obstetric sheet made for the purpose, whilst for those who cannot provide this luxury a clean sheet or blanket must suffice. The important thing is the absolute cleanliness, whatever the actual article used may be.

The Binder.—The next matter is the question of the "binder." A good many practitioners nowadays dispense with this application, but most patients seem to prefer it to be used. If properly applied it can do no harm and gives some comfort, but before it is fixed on care should be taken to ascertain that the uterus is firmly contracted,

feeling like a cricket ball. If, instead of this, it feels large, soft, and flabby, it must be kneaded until it becomes firm. Moreover, the binder had better not be applied if there is a great deal of discharge. The binder, it must be remembered, is of no use to check bleeding, it is merely a comfortable support for the abdominal walls, which have been greatly strained and relaxed. The binder itself should be made from firm calico or cotton, a foot or eighteen inches in width, and of sufficient length to go comfortably round the patient. The common mistake made is to put it on too high up, when it is worse than useless, and will inevitably slip from its position. It is usually fixed by means of safety-pins. The lower part should be passed below the heads of the thigh bones to prevent slipping. The top may be slightly slacker than the bottom, and the whole firmly fixed. After the binder has been applied it is time to leave the patient alone for a time in order that she may have some rest and light nourishment. But some one should remain with her for some time longer in case bleeding or some other mishap may demand attention.

Pulse and Temperature.—The temperature should not rise in a natural case of labour except a day or two after the birth, when a slight rise may occur associated with the activity of the breasts. The pulse ought to be slow and steady, and about the usual rate for that particular individual. Should it be rapid, approaching 120 per minute, the attendant must be on the lookout for some bleeding which is threatened.

Shivering Fits.—It frequently happens that soon after the labour is over the patient has a severe shivering fit, which is simply a nervous reaction following upon the great strain through which she has passed. It will pass off in a few minutes and leave no bad results. She will perhaps complain that she is very cold, and a hot bottle may be given for the feet. A drink of warm tea may also be very acceptable, but no alcoholic stimulants unless there be great weakness. One of the curses of ignorant attendants in midwifery cases is the persistent administration of whisky or brandy at almost every stage of the proceedings. No language is too strong to condemn the practice. Alcohol is a stimulant which may easily set up bleeding from the uterus which would otherwise never have occurred. The patient will soon feel comfortably warm if the bedclothes are suitable, and if she be given a hot bottle.

The Giving of Ergot.—Those who are in the habit of attending cases of labour often give a dose of ergot as a routine practice. The action of the drug is to cause contractions of the uterus, and it is a very valuable agent in cases of bleeding. But as a matter of fact it is entirely unnecessary so long as the uterus is felt to be hard

and firm and the discharge not too copious. In any case, there are two cautions to be carefully noted in regard to its use. First: *Never give ergot under any circumstances whatever until the child is born.* The most disastrous effects may follow. Second: *Ergot should not be given until the placenta has come away.* When it may safely and usefully be given, and its doses, will be mentioned later on.

Further Attention to the Child.—We must now return to the care of the child, and note one or two other matters. It will be found that a newly-born infant is more or less covered with a whitish greasy substance (the vernix caseosa), which should be removed by a thorough careful washing all over in warm water and soap. The temperature of the water should be about 100° F. The child must be carefully dried by means of a soft and warm towel. Particular attention should be paid in both washing and drying to those parts of the body in which there are folds of skin, for example, under the armpits and between the legs. These situations should be powdered. Most important of all, perhaps, are the eyes. These should be carefully washed with water which has been sterilised.

How to Dress the Cord.—A convenient time to apply the dressing to the cord is after drying the infant which has just been washed. The ligature must be examined to see that there is no bleeding from the cut end of the cord, and a second one applied if there be any oozing. The safest way to treat it is then to dust on some antiseptic powder and apply an antiseptic dressing. But as a matter of fact the usual thing is simply to pass the cord through a hole cut or burnt in a piece of clean linen which is then folded round the cord and secured. By far the best way is to treat it as any other wound, and use the antiseptic dressing. A binder of flannel is then applied round the child, and this is best fixed by sewing the end to the folds instead of using pins. Of course, none but safety-pins should ever be used. If the infant appears irritable and uneasy it may be put to the breast provided that the mother is sufficiently strong, but it is preferable that she should have absolute rest for some hours before this is done. A few teaspoonfuls of weak milk and water, with some sugar, will satisfy the child at this time.

The After-Treatment of Natural Labour.—After about an hour has elapsed the diaper which was applied to the patient's vulva should be changed for a clean one. She will also feel ready for a cup of tea or light nourishment. By this time all the soiled things from the bed and soiled clothes should be removed from the room, not thrown under the bed and left there. For the next few hours no special treatment will be called for beyond the ordinary attention to

an invalid patient. Rest and quiet should be the rule. A short word or two with those most interested in her welfare is permissible, but no visitors should be allowed, and conversation restricted. If she can get some sleep all the better, and the light in the room must be so arranged that it does not fall directly in the eyes either of mother or child.

Twelve Hours Later.—After some twelve hours have elapsed it is time to inquire into some other matters. By this time the patient should have passed water; if not she should be encouraged to try and do so. Frequently a patient will not do this because of the pain attending the passage of water for the first time after labour. Sometimes there is no such difficulty. If a doctor is in attendance or a trained nurse, the water will be drawn off by a catheter, thus obviating the necessity of the patient getting up. If no professional assistance is to be had, the patient must sit up and try to pass water for herself, some hot water being placed in the chamber. Special attention should be paid to the pulse and temperature. The pulse will probably be somewhat slower than normal, if rapid there is something wrong. The temperature will remain under 100° F. for three days in the most favourable cases, and after this should fall to the normal 98° F. or thereabouts. If it goes up at night the patient must on no account be allowed up, as some inflammation is threatened, but these complications do not concern us at present.

The Puerperium.—By the term "puerperium" is meant the period which elapses from the completion of the labour to the return of the organs of reproduction to their normal state, and this period varies from six to eight weeks. Of course, it is not necessary nor advisable for the patient to remain in her bed for all this time, but it is very necessary and advisable that she should be most careful to avoid any great exertion until it is over. All her future health depends upon the care she takes of herself in the puerperium, and although many women after a natural labour get up in a few days and do a good deal of work, without any *apparent* ill effects, it tells in ways not seen at the time but felt in after months or years.

Diet.—For the first day or two of the puerperium the patient will be more thirsty than hungry, and to supply this natural demand she should be kept mainly on liquid food; in fact, the diet should be chiefly milk for two days. Toast and plain biscuits, gruel, simple milk puddings, nourishing soup, beef tea, and ordinary tea, will form the main articles of her menu. Especially should the diet be restricted until after the bowels have moved freely, which should occur in forty-eight hours from the time of completed labour. After that more freedom may be allowed, and, in fact, she may gradually return

to her ordinary food and manner of eating. The common sense and knowledge of ordinary invalid and convalescent feeding is all that is necessary, there is nothing specially required. The great point is to remember that if she is nursing her child, milk should be given freely, and if not, it should be restricted in order to check her own secretion. Once more we repeat that alcoholic liquors should not be given except upon medical orders.

The After-Pains.—If the labour be the first for that patient she will escape what are known as “after-pains” in a normal case. But in her subsequent labours they will be encountered. There are further contractions of the uterus which generally last from twelve to thirty-six hours after the child is born, and sometimes are so severe as to be a source of great discomfort. In the ordinary degree they are perfectly salutary in their effects. They are usually stronger if the child is suckling, but do not often come on after the bowels have been moved; in fact, a dose of some aperient will often cause their cessation. It must be remembered that a constant pain is not due to after-pains, they are intermittent. A *constant pain* is a sign of something wrong.

Treatment of the Bowels.—Constipation is the rule just after labour, and hence some opening medicine has to be given within a couple of days. There is nothing better than the old-fashioned dose of castor-oil, a tablespoonful. This is especially good where the patient is nursing the child. If she is not, a dose of Epsom salts or a Seidlitz powder is good. Frequently great relief is obtained from the use of a warm soap and water enema. Once the bowels have moved they should be open once daily at least, and since some drugs are apt to affect the infant through being secreted with the milk, it is better to avoid them and use the enema.

Cleansing the Patient.—In the first few days after the labour it requires constant attention to keep the patient clean, especially if there be considerable discharge. Use fresh antiseptic diapers freely, and burn them at once on removal. The sheet upon which the patient lies must not be allowed to remain if soiled, and it must be cleansed by boiling in order to prevent any source of danger. In all these duties the attendant should carefully wash her own hands in an antiseptic solution before touching the patient. The latter is at this time peculiarly liable to some infections, and too great care cannot be taken by those around her.

The Vaginal Discharge.—During the first few weeks there is a considerable discharge from the vagina, the lochial discharge. It has a peculiar smell, and is at first reddish in colour due to the blood contained in it. After that it becomes more watery and finally white,

gradually getting less and less until it ceases. An abrupt stoppage is abnormal, it should diminish gradually. It is this discharge which makes it so necessary to change the diapers frequently.

Care of the Breasts.—This is a matter upon which the greatest care should be expended, a care which ought to begin some weeks before the labour is expected, if the mother is to nurse the child comfortably. During these weeks the nipples should be drawn out and bathed with whisky and water, or Eau de Cologne and water, in equal parts. They are thus gradually hardened and made less sensitive to the somewhat rough suckling which some children exhibit. It is to be regretted that it is becoming more and more rare for mothers, especially those of the upper classes, to nurse their own children, but we strongly advise every mother to nurse her child herself unless there is some very good reason why she should not do so. The womb itself returns to its normal state much more rapidly and satisfactorily when the child is at the breast than when it is not. The breasts do not give much milk for the first two days, and the first that is secreted acts as a purge on the infant. The child should be given the breast at regular intervals of two hours during the night, care being taken to wash the nipples on each occasion of feeding. Unusual pain and fulness in the breasts will be alleviated by gently rubbing them with warm oil before the flow of milk is properly established, and then putting the child to the breast as soon as there is milk for it.

How to Stop the Milk Secretion.—If for some reason the child is not going to be nursed by the mother, it then becomes important that the milk should be stopped from secreting as soon as possible. "A firm binder should be fastened round her chest so as to compress the breasts. A pad of wool should be placed between them. Her diet must be kept as dry as possible, and when the bowels are moved, saline purges should be used. If the breasts become painful, belladonna may be applied in the form of extract, and glycerine, liniment, or plasters. If the latter are used, an opening for the nipple must be made in the centre of each."

Further Care of the Child.—The further points concerning the care of the child during a normal puerperium are those relating to the fate of the cord, washing the child, the bowels and urine, and food. No trouble need occur from the cord, the stump of which drops off as a rule about the fourth or fifth day, though it may remain as long as the tenth day. All that is necessary is that the cord should be dressed daily, kept dry and clean, and the rest left to take its natural course. The bowels of the infant move as soon as sucking begins, owing to the purgative action of the first mother's milk secreted. The first motions of the child are peculiar in appearance. They

are very dark in colour at first, and are called the "meconium." Very soon they become of a light colour. There ought to be two or three motions during every twenty-four hours, and if there are not some aperient should be administered, the usual one being a small dose of castor oil, say, half a teaspoonful. Before giving this, a careful examination of the child's anus should be made, because it sometimes happens that the reason for the bowels not being opened is to be found in a malformation of the anus, there being no communication from the bowel to the outside. This condition requires surgical interference, and will be referred to later. Sometimes the child has difficulty in passing its urine or the urine is very scanty. Here again there may be some trouble which calls for the surgeon, especially in male infants whose foreskin is tightly adherent, in which case the operation of circumcision has to be performed. If nothing of this kind is causing the trouble, a few drops of sweet spirits of nitre in water may be given. A hot bath will help the urine to pass. Finally the infant should have a warm bath every night and morning, the water being at a temperature of 100° F. When put to sleep care must be taken that the child is so placed so as to be able to breathe freely, and the danger of "overlaying" avoided. It is astonishing how many child-lives are lost by careless or intoxicated mothers either actually lying on the children or pressing them so closely to their sides as to cause smothering. Wherever it is possible the child should be placed in a cot of its own and not be made to sleep with the mother or other children.

When should the Mother get up?—The natural labour having come to a satisfactory issue and all being well with the mother, the question arises, and an important one it is: When should she be allowed to get up from bed? The difficulty is that once the patient is permitted to get up, she wants very frequently to do a good deal more than that, and hence she must be kept in bed until it is safe for her to move about the house. It must be remembered that during the puerperal period all the reproductive organs are getting back to their normal conditions as quickly as possible, and this process has to be encouraged by resting the patient as long as possible, consistent with attention to general health. It is universally agreed by all the best authorities that a woman after labour *should be kept in bed until the tenth day at the earliest*, if she is to have the best chance to do well afterwards. This is difficult to carry out sometimes but it is time saved in the long run, and means health preserved and complications warded off, which too early getting up is often responsible for. The uterus does not get back to its normal condition for some six weeks, and so it can easily be understood how

easy it is to do harm by allowing a patient to move about actively too soon. The ideal is to keep the patient in bed until the tenth day, then allow her to sit up for an hour or two, then to sit up longer and walk about the room a little, gradually to increase the length of time she is up and the gentle exercise, until finally about *the middle of the third week*, the weather being good, she may be allowed out of the house for a walk. She should have plenty of fresh air in her bedroom all this time, but that can be attained without her going out, a simple fact which is not always realised.

General Advice.—The all-important points in the management of a natural labour in a healthy woman for those in attendance may be summed up thus: Have infinite patience: maintain scrupulous cleanliness: interfere with the patient as little as possible: keep her room well ventilated: exclude useless visitors: and forbid alcohol.

SECTION V

THE COMPLICATIONS OF LABOUR

Unnatural, Tedious, and Complicated Labours.—We have already seen that the vast majority of labours run a natural course and are completed within twenty-four hours from the onset of the true labour pains. The next question which claims our attention is the consideration of those cases in which this fortunate course of events is interfered with from one cause or another. The deviations from the normal may be but slight and unimportant, they may be more serious and alarming, or they may be of such a desperate character as to involve the very lives of either the mother or child. According to the nature of the cause and the extent of its interference in the labour, the result is termed a “tedious or laborious” labour, an “unnatural,” or a “complicated” labour. It would be out of place here to enter into great detail concerning some of these cases which involve very technical discussion, we shall therefore confine ourselves to the most important complications of labour, and the indications for their treatment.

Tedious or Laborious Labour.—A labour is put into this category when the portion of the head known as the “vertex” presents, but in spite of that the labour is not completed, from some cause or other, within twenty-four hours. In other words the labour is delayed, and if this delay is considerable, the consequences to the

patient are serious. She suffers from exhaustion of strength, the heart's action becomes weak, as is noted by the thin pulse; she breaks out into cold sweats; she may become delirious; and even a fatal issue may result. The serious effect of great delay in labour may be realised from the statement that the mortality in childbirth is four times greater than normal if the labour extends over twenty-four hours; while the mortality is twelve times greater if the labour extends over thirty-six hours.

The Causes of Delay.—The delay may occur in any one of the three stages of a labour, and the causes of it are to be sought in one of three sources:—First, the delay may be due to *faults in the powers* which cause the child to be driven out of the womb and through the passages; Second, the delay may be caused by defective construction in the passages themselves through which the child has to pass before birth; and Third, the delay may be the result of some defect on the part of the child, either in its own structure or in the way it “presents” itself. It will, perhaps, render the description of the subject clearer if we deal with the three stages of the labour in turn.

Delay in the First Stage of Labour.—This stage, it will be remembered, begins with the onset of the true pains and ends with the full dilatation of the outlet of the womb. Any delay in this stage is very seldom due to the powers of contraction of the womb; they may fail in the next stage, but not as a rule at first. The delay here is due to faults in either the passages through which the child has to pass, or to faults in the child itself or its membranes.

Faults in the Passages.—The only part of the passages which is ever at fault in this stage is the neck or outlet of the womb. This is a strong muscular structure which has to dilate from the size of a minute tube to an opening sufficient to allow the head and body of the child to pass through it. It will be at once understood, therefore, that if from any reason there is a difficulty in obtaining the necessary degree of dilatation there will be a corresponding delay. Now the condition which is apt to cause this lack of dilatation is an undue rigidity of the part concerned. It may be too hard and firm, too inelastic, to yield to the pressure and dilate properly. The simplest form of this rigidity is found in women who have not had children before, and who are getting on in years. It is well known that if a woman is over thirty years of age when she has her first child, she is apt to have a tedious labour; the passages have become somewhat rigid and inelastic, and hence delay. That condition is called “simple rigidity.” When a similar condition is met with in women who have borne children previously it is

termed "spasmodic rigidity," because in this case the outlet is closed by a spasm of the muscles which form the circle round the outlet. Both these forms of rigidity can be treated without much difficulty either by medicinal or artificial means, but there is a third form of rigidity which is more serious, namely, the form called "organic rigidity." Here the cause of the non-dilatation is some abnormal hardness of the tissue of the neck of the womb, which is due to some old-standing inflammation at that spot, or from hard scars having formed there after former tears have healed up. This scar tissue, like that in any other healed wound, is very firm and fibrous and inelastic; it therefore does not stretch. Lastly, the neck of the womb may be the seat of some malignant growth such as a cancer, which again causes difficulty in its proper dilatation.

Treatment of Delay in the First Stage.—That part of the treatment which may be carried out by the attendant or nurse, resolves itself into the application of a hot sitz bath or the giving of a hot antiseptic douche. Both of these, but especially the latter, are most beneficial, and are frequently all that is required to secure full dilatation of the rigid passage. Should they fail, the treatment becomes a matter of medical advice. The drugs used are chloral and morphia, and if necessary chloroform. Chloral is given in doses of fifteen grains for this purpose. Morphia is administered as a suppository containing a quarter grain of morphia. If these are without benefit the patient is put under chloroform, and this alone sometimes brings about the desired result; at other times the physician has to artificially dilate the rigid passage with the finger, or a special form of apparatus made for this use.

Other Causes of Delay in First Stage.—The womb may be at fault in respect to other matters besides mere rigidity of its outlet. The outlet may be absolutely closed up, its lips glued together as it were, or actually grown together and adherent in scar tissue. In the former case artificial dilatation is resorted to; in the latter, the scar tissue must be incised by the surgeon before dilatation can occur. Then occasionally we find that the womb is in a wrong position; it may be oblique, giving rise to the condition known as "pendulous belly," which prevent the powers of contraction acting in the proper direction. In this case the treatment is to put the patient on her back and apply a tight binder, which will keep the womb in its correct position. Lastly, another cause of delay due to the womb is the impaction of the lowest part of the neck of that organ between the head of the child and the bony pubic symphysis. This neck of the womb ought to retract over the head of the child, and allow the head to pass through it, but it is sometimes pushed in

front of the head and thus impacted or caught in the position stated. When this occurs the neck must be pushed up over the head in the intervals between the labour pains, and supported during the pains. All these causes of delay are encountered, and all, it will be noted, are faults in the passages.

Faults in the Passenger.—The child and the membranes are called the “passenger,” because during the labour they traverse the passages. Delay may be due to faults here too, especially in connection with the membranes and their contents. In fact one of the most common causes of delay in the first stage is an excess of the amount of water or “liquor amnii” contained in the bag of membranes. Now and then this water is present in enormous quantity, causing a great distension of the womb and leading to the labour pains becoming feeble and inoperative. Feeble pains occurring at long intervals are characteristic of this fault. The treatment is to rupture the membranes. Precisely the opposite condition may occur and also cause delay, namely, absence of the fore-waters. As was pointed out on a previous page, these fore-waters form a wedge which precedes the head of the child and opens up the passage. If they are entirely absent or very deficient in quantity, delay is caused by the absence of this normal fluid wedge. The treatment is to rupture the membranes and allow the head to come down and itself act as the dilator. If the water is merely deficient the head is to be pushed up so as to allow what little water there is to act as the wedge. The too early escape of the waters is responsible for a similar result, namely, delay; and this may happen even before the first stage of the labour has begun. As a rule the patient is able to say whether the waters have escaped or not, but she cannot invariably be trusted in this matter. Premature rupture of the membranes before labour is caused by their unusual thinness, and the result is called a “dry labour.” It is of necessity rather tedious. One other fault in the membranes may cause delay, and that is the condition in which they are adherent to the lower part of the wall of the womb, in which case it is necessary to have them separated.

General Rules for Delay in the First Stage.—So long as the membranes remain unbroken it may be put down as a general rule that there is very little danger to either mother or child. If the pains are slight and occur at too long intervals there will be delay but not necessarily danger; in fact a sedative of opium or chloral is often given in such a case which allows of a further period of rest to the patient, after which the pains come on with more strength and good results. More danger attends very severe and exhausting pains which fail for some reason in their purpose of dilating the womb.

Here again opium or chloral is given to give rest to the patient. In all cases the membranes should be kept intact until dilatation has occurred, unless the delay is caused by the excess of the fluid in them, or its entire absence. Once the membranes have ruptured, the whole possibilities of the labour are different. If there are no pains the patient may be left alone indefinitely. If the pains are feeble it is better to stop them altogether with a sedative, and wait until they come on stronger, as they will after a period of rest. The danger is to be feared when the pains are severe, *but no progress* is made with the labour. That means serious complications and grave risk to mother and child, and skilled attention is demanded at once.

Delay in the Second Stage of Labour.—This is the period of danger to both mother and child from undue delay, and it cannot be too strongly impressed upon those in attendance on confinements that this stage must not be allowed to go on too long. Many a life is thrown away through ignorance on this matter. People wait and wait in the hope that all will come right, because they know that many cases do come right, and after a long time when they become alarmed at the non-progress of the labour they send for skilled assistance. In the meantime the patient has become utterly exhausted in fruitless efforts to drive out the child through the passages, and too often when help does arrive both mother and child are beyond recovery.

How Long to Wait.—It is quite impossible to lay down hard and fast rules about this, almost every case must be judged on its own merits. Speaking generally, however, one may say, that in the case of a woman bearing her first child, the second stage should not last longer than four hours. In other words, the child should be born not later than four hours after the full dilatation of the mouth of the womb. In the case of a woman who has borne children previously, three hours is as long as this stage ought to last. But even this general statement must be qualified by saying further, that while many cases will go on longer than these times without anything serious happening, others cannot be permitted to go on even so long without the gravest risk to both mother and child. So that it will be realised that this is a matter for an expert opinion, and one upon which no dogmatic statement can possibly be made. The practical point is, that if any cause of delay is known to exist or is recognised it must not be left to nature to chance its being set right. The natural powers can do a great deal, but they often require prompt and skilled assistance.

The Causes of Delayed Second Stage.—As in the first stage these have to be considered as they are found in the powers

of contraction, the passages through which the child passes, and the passenger itself. The faults in the powers are as follows :—Weakness of the pains, irregular pains, and inefficiency of the voluntary muscles of the belly wall to help the womb contractions. In the passages there are a great many causes which may give rise to delay, the most important being: Rigidity of the soft structures of the vagina and perineum, distension of the rectum or lower gut, distension of the bladder, tumours of various organs and in various positions, and various deformities in the bony parts of the mother's pelvis. Of the third set, the causes of delay in the passenger, the following may be mentioned: Undue toughness of the membranes, an unusually large head on the part of the child (either a healthy or diseased enlargement), a very short umbilical cord, some malformation of the child, some malposition of the child's head, a falling down of an arm of the child or prolapse, as it is termed. So that it will be seen that it is in this second stage where the great danger of delay is to be encountered, due to the great variety of causes which may come into operation during this stage.

Delay in Second Stage, due to the Powers.—Weakness or irregularity of the labour pains or womb contractions is the most important cause of delay here. That weakness may be simply a constitutional matter, the patient being a weak person, or she may be at that particular time in a condition of general debility. Other cases are those of women whose pregnancies have followed one another too rapidly and too often. Weak pains are apt also to occur in very young mothers and those who are at the other extreme of the child-bearing age. They may be due also to mental shock, a purely nervous phenomenon; from exhaustion caused by delay from other causes; from over-distension of the womb in cases of twins or too much fluid in the membranes; or from the presence of tumours in the wall of the womb. From whichever of all these the weak pains come, the condition is termed *inertia uteri*, or weakness of the womb. The condition will be readily understood if we remember that the womb is merely a special muscle, and therefore liable like other muscles to fatigue from over-exertion, acting best when it is healthy, fully developed, and not exhausted; acting worst when it is overworked, too young or too old, or affected by disease.

Treatment of Weak or Irregular Labour Pains.—Common sense would tell us that any muscle which is tired, weak, or exhausted must be rested before it can be expected to put forth its best efforts. That is the key to the successful treatment of inefficient labour pains. The feeble pains are useless to drive out the child, so they are best stopped altogether until the womb has rested. This is

secured by giving opium to secure absolute rest for a time, always under medical advice. After a time, if there be nothing very wrong, the pains will come on again more strongly and the labour will proceed. If they do not, it is a certain indication that assistance will be, in fact is, needed. Under no circumstances whatever should any non-professional attendant be permitted to give any drug at this stage with a view to stimulating the labour pains. The most disastrous results may follow the administration of ergot, for example, at this time. Rupture of the womb and death of the mother may follow. The nurse may apply gentle massage through the belly wall to the womb to try and stimulate contractions, or hot fomentations may be applied over the womb. Sometimes the patient by changing her attitude or position may bring on satisfactory pains. The poorer Irish classes, for example, are very fond of putting themselves on their hands and knees at this stage. But if these simple means fail it means that the child will not be born naturally, artificial means of delivery will be required, and assistance must be procured forthwith. Once more we say, do not wait too long, or the patient will be exhausted.

Irregular or Spasmodic Labour Pains.—These are caused by the womb contracting only in part. The pain is very severe. This is usually due to exhaustion, some disease of the wall of the womb, or over-distension of the bladder or the bowels. The obvious indication for treatment is therefore to be careful to see that both the bowels and the bladder are thoroughly emptied, while the pain, when it becomes extreme, may be relieved by a dose of opium or chloral by medical advice.

Delay from Patient not Bearing Down.—It sometimes happens that the patient herself is partly in fault, and causes or contributes to delay, by not bringing her full energy to bear in using her belly muscles. These secondary powers are under her own control, and she should be instructed to hold her breath and help herself as much as possible. But she may be unable to do this from some ill-health, such as a weak heart or lung disease, or she may be the victim of dropsy or a tumour in the abdomen, when she cannot bear down without risking the strain. In such cases the assistance which a healthy woman can give is wanting, and it will cause some delay. It means that the labour will be more tedious, and assistance will probably be wanted.

Faults in the Passages causing Delayed Second Stage.—The passages through which the child has to pass in the second stage of labour are the vagina, the perineum, and the vulva, on the one hand, and the bony pelvis on the other. The former are termed

the soft parts, and they may be the source of delay in this stage from undue rigidity, just as the outlet of the womb was in the first stage. A narrow and rigid vagina is somewhat common in elderly and muscular women, especially if they have not borne children before. Sometimes there are old scars in the vagina which do not stretch. More rarely tumours will be found to prevent the proper dilatation. The simple rigidity may be treated by a hot douche or a hot fomentation, but the more serious causes of delay, such as tumours, require surgical interference. Rigidity of the perineum is most common in first labours, where the patient is an elderly woman; or if that structure has been torn in a previous labour and stitched up, leaving a solid scar which is inelastic. An over-distended rectum or lower bowel will cause delay, and often does so, by causing pressure on the vagina. An enema of warm soap and water is all that is necessary, but this should always be attended to, as it is one of the most common causes of delay in the second stage. Similarly with the bladder. Distension of this organ not only prevents the contractions having their full effect, but also forms an obstruction in the passages, where all the room available is required. If the bladder cannot be emptied by the patient herself, even after the application of hot fomentations, the water must be drawn off by means of a catheter.

Other Causes of Delayed Second Stage.—There are many other more rare conditions which may cause delay in the second stage of labour, but their treatment falls to the specialist, and they need only be mentioned here. The most important are as follows: Stone in the bladder; an internal hernia or rupture; a falling or prolapse of the front wall of the vagina; tumours of the ovary or its ligaments; tumours of the other passages; obstruction from stiffness of some of the joints which are rigid; and abscesses of the soft parts; all of which require very special surgical interference and generally necessitate delivery of the child by forceps by the medical attendant.

Delay Caused by the Passenger.—All the causes above considered which produce delay are those on the part of the mother. But the child and its membranes may also be responsible for delay. One of the most common causes of delay on the part of the passenger is an unusual toughness of the membranes, whereby instead of rupturing at the proper time and allowing of the escape of the fore-waters, the membranes remain intact, and being driven in front of the head of the child show themselves protruding from the vulva. It is for this reason that the membranes should always be ruptured when the mouth of the womb is fully dilated. As we mentioned on a previous page, if the child be born enveloped in membranes, it is termed

“a caul,” and unless promptly opened the membranes will cause suffocation.

Delay from Unusually Large Head.—The size of the child's head has a most important influence on the course of the labour. It may be unduly large from several causes, and the larger the head the longer it will take to be delivered, simply because more dilatation of all the passages is necessary before it can pass through. This enlargement of the head is sometimes merely because the child is a large child altogether, large for the mother. It is what is termed a “natural enlargement.” It does not follow that because the mother is a small woman that therefore her child must be small; on the contrary, very often it happens that small women have large children, and hence the labour is delayed. Then delay itself, from some other cause, is apt to produce alterations in the shape of the child's head which make it larger and more difficult to expel, and in some cases the bones of the head become joined together prematurely and so prevent the “moulding” spoken of previously. All these causes produce a large head, which is still a healthy one. In addition, the head may be large as the result of disease, such as water on the brain (or hydrocephalus), a condition caused by accumulation of fluid in the cavities of the brain. This is a rare occurrence, being found only in one of every three thousand children. In all these cases of very large head, the danger is that the womb may be ruptured from the neck of the womb being unable to retract over the head. In the enlargement due to disease, surgical interference will be necessary to save the mother.

Delay from Shortness of the Cord.—It is rare to encounter an umbilical cord which is actually so short as to be a source of trouble, as short as eight inches, for example. But it is not uncommon for the cord to be found coiled round the neck of the child, the effect of which is the same as if the cord were itself actually short. Whether actually short or merely coiled, the dangers to be feared are that the womb may be turned inside out (inverted) by the traction on the short cord as the child descends; second, that the after-birth may be separated from its attachment to the womb too soon; and thirdly, the cord itself may be ruptured. The treatment, in all cases of the shortness of the cord, is to cut it if accessible, tie securely, and deliver the child as rapidly as possible.

Delay from Malformation of the Child.—A most serious cause of delay under this category is an actually malformed child. The malformation may be due to some error in development, or from disease which has affected the child during its life within the womb. In addition to the condition of “water on the brain” (hydrocephalus)

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already mentioned, the child may have a large tumour attached to the back of the head, caused by the membranes of the brain protruding through an opening in the skull. This is called a "meningocele." A similar malformation occurs in the region of the spinal column, the membranes protruding between the vertebræ. Here the condition is termed "spina bifida." In other cases the chest cavity may be distended with fluid (hydrothorax), the belly may be full of dropsical fluid, or the kidneys of the child may be the seat of tumours causing great enlargement. Still more rarely actual "monsters" occur, as when two fetuses grow joined together, like the Siamese twins. All these are very rare conditions, and we only mention them to impress upon the reader that delayed second stage in labour may be occasioned by very varied and numerous abnormalities, and that therefore it is important to recognise the necessity of securing skilled advice before things have been left too long. Many of these cases render it necessary to destroy the child in order to save the life of the mother, and to that end all efforts are to be devoted.

Delay from Falling of the Hand or Arm.—Occasionally the hand or the whole arm of the child, instead of remaining folded across the chest, falls down in front of the head (prolapse), and then constitutes a serious cause of delay. Indeed, should it not be replaced behind the head of the child, it is apt to become jammed between the head and the bones of the pelvis, and give rise to great trouble. It is necessary in many of these cases of falling of an arm for the physician to turn the child round in the womb, in order to deliver it. This can only be done at a comparatively early stage, and therefore it is not safe to wait too long before obtaining assistance.

Complications due to Anomalies of the Pelvis.—We have now to consider another group of conditions which interfere with the natural course of labour, namely, those malformations of the pelvic bones of the mother which give rise to abnormal positions, shapes, or sizes of the pelvis, especially the class of deformities known as "contracted pelvis." A pelvis is considered to be normal or otherwise according to whether it conforms to certain definite measurements ascertained by taking the sizes of a very large number and striking the average. By this means a number of so-called "diameters" are arrived at, which are simply measurements from fixed points on the bony pelvis to other fixed points. If the reader will refer to the description and illustration of the bony pelvis on a previous page this will become clear. Thus we speak of the internal diameters of the pelvis, these being the measurements of a normal pelvis at its inlet, in the cavity of the pelvis, and at its outlet. In the same way we refer to external diameters. Now when owing to some disease or

natural deformity of the bones concerned these measurements are smaller or larger than the average, the course of the labour is very seriously interfered with, and it may become impossible for a child to be born without interference. Contractions of the pelvis are usually met with at the brim of the pelvis, but they may be also present in the cavity and at the outlet; in whatever part of the pelvis they are, the labour is bound to be affected.

General Effects of Contracted Pelvis.—First of all it is to be noted that a contracted pelvis tends to cause displacement of the womb during the pregnancy before labour begins. A characteristic sign of a contracted pelvis in a woman who has not had previous labours is the “pendulous belly,” to which we have previously referred. Then, when the actual labour comes on the manner in which the child presents itself is markedly affected. In contracted pelvis unnatural presentations are three times more frequent than in normal pelvis, because the head of the child is unable under these conditions to accommodate itself to the shape of the lower part of the womb. As the labour proceeds, we find that the first stage is delayed, and the membranes are apt to show the sausage-shaped appearance spoken of previously. At other times the membranes rupture too soon, due to the inability of the head to get down sufficiently. As we have already seen, an entire escape of the waters is a cause of delay. Further, it of necessity follows that in these cases of contracted pelvis there will be delay in the second stage, because the natural mechanism is interfered with and often materially altered, the precise alteration depending upon the special type of contraction which is present.

Effect of Contracted Pelvis upon the Mother.—The presence of a contracted pelvis makes the issue of a labour much more doubtful for the mother, and the mortality in labours of this character is considerably increased, varying, of course, with the degree of the contraction present. There is necessarily more risk of her becoming exhausted from inability to bring the labour to a conclusion; there is the very grave danger of the womb rupturing as the result of the impossibility of expelling the child from its cavity; there is the risk of injury to the soft structures, muscles and mucous membranes in the passages, which may be destroyed from pressure and die, causing sloughing: and lastly, there is the added risk from the fact that artificial aid has to be resorted to in order to extract the child. For all these reasons a contracted pelvis means that the outlook to the mother is much more unfavourable than in a normal case.

Effect of Contracted Pelvis upon the Child.—Not only the mother, but the child too, runs serious risks from these defor-

mities. In the first place the "presentation" is frequently abnormal; then, as mentioned above, the waters may escape too soon: the cord is apt to fall in front of the child: and there is the additional risk of the necessary artificial delivery. The effect will vary according to the degree and special type of the contraction; in the very worst cases the child has to be sacrificed in order to save the mother.

The Diagnosis of an Abnormal Pelvis.—The consequences to the mother and the child being so serious, it becomes of the greatest importance to be able to make a general diagnosis of the presence of these malformations. We have to form our opinion by recognising and appreciating certain signs, some of which point to the probability and others to the certainty of contracted pelvis. In the former category comes the history of previous labours in women who have had children before, a matter which should always be elucidated. At the same time her general appearance, build and stature, should be noted, as well as her carriage when walking. Her own infantile history must be inquired into, in order to ascertain whether there was any deformity seen at birth or noted since; at what age she began to walk: whether she has been the subject of any injury to the bones of the pelvis or ever suffered from a dislocation of the hip-joint. The spinal column must be examined for any deformity or curvature, and if such be present, it must be ascertained at what date this came on. If early in life this is probably the result of rickets, and if so the bones of the legs will be found to be somewhat curved also. There is almost always pelvic deformity in cases of rickets, but if the history of the patient proves that the spinal curvature did not make its appearance in early life but in adolescence the cause is in that case not rickets, and the pelvis may be quite normal in spite of the curved spine. It should also be noted whether the patient suffers from lameness, as this often indicates pelvic deformity. Then as to her previous labours, if any. We inquire if they were natural or complicated, whether the child was born living or dead, and if there were any instruments used, and if so of what nature. If possible too, we should endeavour to find out what caused the difficulty if any in previous labours, because that cause may have been one which need not occur necessarily again, such as the large size of the child's head; on the other hand it may have been of such a nature that it will inevitably give rise to trouble at each successive labour. It must also be remembered that even if the first labour was natural, there might still be some contraction which would interfere with the subsequent labours if the children were larger than the first one born. The sign of the "pendulous belly" has been already referred to, and is another

indication of the possible presence of some form of contraction of the pelvis. All these may be termed probable signs.

Certain Signs of Deformity.—The positive proof of deformities of the pelvis can only be obtained by measurements. These measurements are obtained in three ways: by an instrument called a pelvimeter, by an ordinary tape measure, and by the hand or fingers. It is first ascertained whether one hip is higher than the other, the woman being lying on her back; but want of symmetry in this respect is extremely common, so much so, that it is only when there is a very marked deviation that the observer would suspect anything seriously wrong. Then the external measurements before referred to are made, the figures compared with normal measurements, and an opinion formed as to the presence or absence of deformity.

The object of these measurements is to ascertain what is the size of the diameter of the pelvis at the brim, where the head of the child enters the pelvis. This can be approximately ascertained by taking the distance between the two bony prominences of the iliac bones called the "spines" (anterior superior iliac spines), and subtracting from this measurement five inches. The measurements must be taken with an instrument devised for the purpose, called "calipers."

General Treatment in Contracted Pelvis.—It would be beyond our province to enter into great detail concerning the operative means used to overcome the difficulties encountered in cases of contracted pelvis, but briefly they are the following. In the case of the least serious diminution of the measurements the child is delivered by means of forceps. In more marked diminution it is often advisable to bring on the labour prematurely before the child attains its full size. If, however, it has gone to full term, an operation involving the division of the pubic joint is performed, in order to gain sufficient space through which the child may be delivered. In still more profound diminution of pelvic measurements the operation of "craniotomy" is resorted to, which involves the destruction of the child by means of reducing the size of the head. Finally, in the extremely small pelvis in which delivery is quite out of the question, the operation of "Caesarean Section" is performed, in which the child is removed by opening the abdomen and removing it from the womb in that way. We merely mention these procedures in order to show how desperate such cases of contracted pelvis may be; the operations themselves are of course very serious ones, and too technical in their details to need description here. The selection of the special mode of treatment to be adopted in any particular case is a matter for the careful consideration of the most skilled obstetrician.

Types of Contracted Pelvis.—Without entering into minute

details it will be well at this point to indicate the chief sorts of deformities met with in the pelvis and the effects that each produces upon the mechanism of a labour. The simplest type of deformity, if it can be so called, is that in which the whole pelvis is simply undersized, all the diameters or measurements being reduced proportionately, the result being an abnormally small pelvis, but one in which the general contour is accurate. The effect which such a small pelvis produces upon the mechanism of labour is to cause a very marked bending (flexion) of the head if the head is the presenting part, an effect which is exactly the same as that produced by an abnormally large head in a normal sized pelvis. The treatment in the case of this small pelvis is the application of forceps if the delay is great in the labour. The true deformed pelvis are of several types, and are termed Flat Pelvis and Irregular Contracted Pelvis, the latter group presenting contractions of very varying characters and directions.

Flat Pelvis.—Flat pelvis are of two sorts, those due to rickets and those which are non-rachitic. The latter, the simple flat pelvis as it is termed, is found in a number of women who exhibit no other abnormality of structure which would give rise to any suspicion of its presence, the patients being as a rule of normal stature and good development. No history of disease or injury to the spine in early life can be obtained, and as a matter of fact the cause of the condition is not at all clear. It is, however, a not uncommon condition. The explanation usually given is that it is due to the sacrum sinking forward from the simple effect of the body weight. Whatever the cause the result is an increase in the transverse diameters and a diminution in the measurements from back to front of the pelvis, although extreme contraction is not usual. The second type of flat pelvis is definitely due to the disease of rickets, the deformity resulting from the pressure upon the base of the sacrum causing the bone to descend and partly to turn round as well. This results in a diminution of the measurements at one point or rather in one direction, the other measurements being increased, the pelvis as a whole thus somewhat deformed. In rickets there is an abnormal softening of the bones which makes them yield to pressure, and in this deformity this softening results in the iliac bones becoming flattened as well as the sacrum.

Effect of Flat Pelvis on Labour.—Because of the narrowing of the inlet of the pelvis the head of the child does not enter the pelvic cavity, but is apt to be turned aside, giving rise to what is called a transverse presentation. If, however, the head does come first, there will be delay during the first part of the labour while the

head is being forced through the narrow pelvic inlet, while subsequently to that, the mechanism will be the same as in a normal labour, and the delivery often more rapid than usual, because the other measurements are increased. This is especially the case in flat pelvis from rickets. In those not due to rickets there is often still delay, because the diameters of the cavity and the outlet may be diminished as well as that of the inlets. The treatment will usually be the delivery of the child by forceps.

Transversely Narrowed Pelvis.—In this type of pelvis three deformities are to be mentioned. The first is due to a disease “of which the essential cause is a diminution of the earthy salts of the bones, this diminution being such that these salts are two, three, or even five times less than normal, and of which the most marked results are changes in the forms of the bones in consequence of their great flexibility.” (The disease is termed “Osteomalacia.”) Once begun this condition is made worse by successive pregnancies, and this is more marked if the intervals between the pregnancies are short. The patient is usually a small woman. The transverse measurements of the pelvis are all diminished, and the treatment will depend on the degree of the deformity, as indicated in a previous paragraph. Secondly, there is a transversely contracted pelvis due to an imperfect development of the sacrum and a non-expansion of the iliac bones. This pelvis retains the infantile shape, which is that of transverse contraction. It is called Roberts’ pelvis, after the observer who first described it. It is extremely rare and need not be noticed further. Thirdly, there is a transversely contracted pelvis caused by curving of the spine. The sacrum is turned backwards, just the opposite to that which obtains in the flat pelvis from rickets, and the result here is therefore that the delay in the labour takes place at the outlet of the pelvis.

Obliquely Contracted Pelvis.—The best known pelvis of this type is the so-called Naegele’s pelvis, an obliquely contracted pelvis due to the lack of expansion of one iliac bone, giving rise to a pelvis which looks lopsided, as indeed it is. The inlet of the pelvic cavity is asymmetrical, the transverse measurement being lessened all through the cavity to the outlet. It is a rare malformation. Obliquely contracted pelvises are also caused by lateral curvature of the lumbar part of the spine, a deformity which may render one side of the pelvic canal useless as regards furnishing space for the passage of the child during labour. The delivery will have to be accomplished by forceps if it is possible to deliver a living child through the degree of contraction present.

Other Complications of Labour.—We must now turn our

attention to an entirely different aspect of the complications which may arise in labour, namely, those which are brought about by abnormal positions of the child. It will be remembered that in the great majority of labours we have what we have previously explained as "a vertex presentation." But it sometimes happens that other portions of the head present themselves, and indeed other portions of the body, and these anomalies give rise to complicated labours. Of these we may note the following kinds of presentations:—face, brow, and pelvic presentations.

Face Presentations.—This complication is said to occur in about one labour out of every two hundred and fifty. It may be primary—that is, the face may present from the first, but this is unusual; more often it is secondary—that is, it comes on after labour commences, from the head becoming extended off the chest of the child instead of flexed or bent upon the chest, as in the normal vertex presentation. Various causes may prevent the head from bending in the usual way. For example, the cord may be coiled round the neck, lifting the head up as it were; the arms of the child may be between the chin and the breastbone; the chest may be very prominent; or some abnormality of the pelvis may force the head into the face position. The effect on the labour of a face presentation is to tend to delay the first stage of the labour, because the face forms but a feeble dilator of the passages compared with the back of the head. In the same way the second stage is delayed, and in this stage the child may take up such a position which absolutely prevents its being born spontaneously. The treatment of face cases depends upon the exact position of the child, and whether it is a first labour or not. In a woman who has had previous children the labour may be left alone for some time, and only if there be great delay will it be necessary to use forceps. In certain positions in the case of a first labour, however, the operation of "turning" is performed, because there is a danger of the chin turning backwards into such a position that forceps are unable to deliver the child. The outlook to the mother in these face cases is favourable, but to the child it is very grave. Thirteen per cent. of the children are born dead, either from the long delay or from compression of the head. "The child when born usually presents an unsightly appearance from the swelling of the face and the elongation of its head; this disappears in a few days." In such a case the child should be kept away from the mother's inspection as long as possible to avoid the mental shock she would otherwise sustain.

Brow Presentations.—These complications are the result of causes similar to those which produce face presentations, but in this

case the brow of the child is the part which presents. They are thus intermediate between the normal "vertex presentation" and the face cases above described. As the labour proceeds it all depends upon whether the head bends forwards or backwards as to what happens. In the former case the presentation will become the normal vertex presentation, in the latter it will develop into the more serious face presentation. The brow presentation may, however, persist as such, in which case the effect may simply be that of delay in the labour. The forehead in some instances turns backwards, and then spontaneous delivery is impossible. The mortality of mothers in brow cases is increased from the delayed labours, and to the child the outlook is somewhat grave, the mortality of the children being 18 per cent. The treatment depends upon the way in which the child turns as the labour progresses. If diagnosed early the physician will attempt so to alter the position of the child as to make it into a normal vertex case by pushing up the face during a pain. If this be unsuccessful he will perform the operation of "turning," while if the labour be far advanced the case will be left alone as long as it is safe to the mother to do so, failing which forceps will be applied. In the worst event the child may have to be destroyed.

Pelvic Presentations.—Three kinds of presentations are included under this class, namely, breech, footling, and knee presentations. One or other of these occurs in one in every thirty-three labours. They are more frequent in twin pregnancies than in single pregnancies. The last one, the knee presentation, is by far the most rare. Whether the knees, feet, thighs, or the pelvis of the child presents, all are included in the general term "pelvic presentation." The chief causes of this complaint may be summed up as follows: Anything which alters the normal shape of the womb, twins, water on the brain of the child, monsters, death of the child in the womb, premature labour, and the after-birth coming in front of the child. The management in the first stage consists in leaving the case alone and preserving the membranes intact if possible until the full dilatation of the mouth of the womb has occurred, this being one of those conditions in which early rupture of the membranes is apt to happen. In the second stage the labour is left alone until the breech of the child is born, so that the passages may be thoroughly dilated to make room for the head, which is the last part to come. It is the birth of the head which gives rise to the difficulty and danger to the child. The cord is apt to be much compressed between the head and the pelvic bones, and so it is necessary to deliver the after-coming head as quickly as possible. After the breech is born the cord should have a loop pulled down. Examine the cord for pulsation. If there be

none there is no further hurry, as this indicates that death of the child has already taken place. If the cord is pulsating the delivery of the head must be assisted, but only by pressure above the pubis, not by pulling on the child. It is absolutely necessary for the quick delivery of the child that the head be well bent (flexed), therefore the very last thing is to pull on the legs, which will extend the head instead of flexing it, and it is this extension which is the most common cause of delay. To assist delivery of the breech various modes of traction are applied. One or both feet may be pulled down if the knees are bent. This lessens the size of the breech and renders the subsequent delivery comparatively easy. If the knees are extended traction can be made by putting the fingers into the groin of the child and pulling down the breech. A skein of wool may be passed round the groin and traction thus applied. The forceps may be used applied to the breech. In some cases the arms of the child give rise to difficulty and delay. They may be extended above the head, and have then to be freed by passing them over the face one at a time with great care so as to prevent breaking the delicate arm bones.

Extension of the After-coming Head.—This is the commonest cause of delay in breech presentations, and is often caused by injudicious pulling upon the body of the child and the lack of pressure above the pubis. The cord is almost sure to be compressed, and for the safety of the child delivery should take place in five minutes after the breech is born. It is necessary therefore to take every means to promote the bending forwards or flexion of the head, and to assist the muscles of the mother's abdomen in driving out the head, because the womb has very little power to expel the after-coming head. Delivery can be aided by passing the hand into the passages, placing the fingers on the child's jaw, making pressure, or by applying the forceps to the after-coming head. By far the most difficult complication is that which results from the outlet of the womb closing round the neck of the child after the trunk has passed out of the cavity of the womb. This has to be dealt with by pressure from above externally, traction of the feet, forceps if they can be applied, and if everything else fails the child must be sacrificed. The outlook for the mother is satisfactory in these cases, but to the child it is of necessity very grave. One out of every five cases is born dead.

Cross-Births or Transverse Presentations.—These are also called shoulder cases, they are not really transverse presentations but rather oblique, and they occur in about one of every two hundred and forty labours. The actual part which presents is either the shoulder, hand, elbow, or ribs. The causes are much the same as those of pelvic presentations. Artificial delivery is always indicated, and the earlier

the diagnosis is made the less dangerous is the treatment. The outlook to the mother is grave if the labour be advanced, because natural delivery is practically impossible, but if the case be recognised before the membranes rupture the outlook is good. To the child the outlook is very serious, almost half the cases terminating fatally for the child. The treatment is the operation of "turning" if feasible.

Still-Birth or Death of the Fœtus.—The definition of the condition of still-birth is "asphyxia of the new-born child not incompatible with the continuance of life." "The infant may be born apparently dead; it utters no cry, makes no movements, there is no pulsation, or only a feeble pulsation in the umbilical cord, and it may be impossible either by the ear or by the finger to detect any beating of the heart. Yet the child may not be really, only apparently, dead, and its life is in the hands of the physician. Two forms of this asphyxia may occur in the new born, which from the appearance of the latter have been distinguished as pale and livid. The first, which is the most serious form, is characterised by general pallor of the skin, the lower jaw drops, and the mouth is open; the limbs are relaxed and limp, and the body is without firmness, taking such shape as may be impressed upon it by external causes. In the second form the child is dusky red, sometimes purplish, the colour being most marked upon the face and upper part of the trunk, the lips are swelled and dark, the limbs are not flaccid, but may be even somewhat rigid; the body as to its external portion seems to have an excess of blood contrary to that which is observed in the first case; the cord is large and its vessels are full of blood." The causes of still-birth or asphyxia of the new born come under two categories, those of interference with the maternal circulation and those of interference with the circulation in the child. The maternal circulation may be interfered with on account of bleeding during or before the labour; in the condition known as eclampsia; in acute chest diseases; and of course it stops in the event of the mother's death from any cause. All these react upon the circulation within the child. The foetal circulation itself is interfered with in various ways of compression of the cord or membranes; by separation of the after-birth; by compression of the head and chest of the child in cases of small pelvis of the mother; in face presentations, and in the application of forceps. The interference of the circulation in any of these ways results in the accumulation of an excess of carbonic acid in the child's blood which first irritates the respiratory centre and causes attempts at respiration. This may result in the child inhaling the fluid of the liquor amnii. A still further excess of carbonic acid paralyses the respiratory centre and also the heart, and in this case the child must be very quickly

delivered if a fatal issue is to be avoided. In both kinds of still-birth the outlook to the child is very serious, more especially in the pallid or pale type.

Treatment of Asphyxia of the New Born.—In the livid form the following rules should be carried out: "Remove inhaled fluids from the mouth and upper air passages with a corner of a towel. Invert the child and excite respiration by stimulating the skin by slapping the buttocks. Dash a handful of cold water over the chest. Perform artificial respiration. If still unavailing, put the child into a warm bath (106° F.); allow a little blood to escape from the cord, and pass a gum elastic catheter into the windpipe. Persevere with the treatment as long as the heart beats." In the pallid or corpse-like form of still-birth, the treatment again involves the clearing out of the mouth and upper air passages, putting the child into a hot bath, and then into warm flannel, performing artificial respiration, and blowing air into the lungs through a catheter to make them expand.

Artificial Respiration in Still-Birth.—Two methods of artificial respiration are used to treat this asphyxia. The first is known as Schultze's Method, and is performed in the livid congested type of still-birth. It is thus carried out: "Hold the child face forwards, with fingers spread over the back, thumbs over the collar-bones on the front of the chest wall, and the forefingers in the armpits. Then slowly raise over the shoulder until the child is totally inverted, with the legs dropping behind the operator's back. Return slowly to the original position, and repeat the movement eight to ten times a minute." The second method, used in the pallid type of still-birth, is termed Sylvester's Method, and is thus performed: "Place the child on the back with the shoulders raised. Fix the feet and pull forward the tongue. Grasp the arms above the elbow, slowly turn them outwards, and draw them up to the sides of the head. Then slowly return and press them firmly on the sides of the chest. Repeat this movement for some time before giving up all hopes."

Complications due to Bleeding.—We have now to consider a group of complications caused by one form or other of hæmorrhage or loss of blood, one of the most serious and alarming occurrences which complicate labour, and one calling for the promptest and most energetic treatment if life is to be saved. A certain amount of blood is lost in every labour; it is the inevitable result of the stretching of the parts involved, and is of no great consequence. The kind of bleeding which is dangerous to the life of the patient comes from one of three conditions:—a malposition of the after-birth; what is termed accidental hæmorrhage; and thirdly, what is termed "post partum" bleeding, or bleeding after delivery. These must be noted separately.

Bleeding from Wrong Position of the After-Birth.—

This condition is technically termed "*placenta prævia*," which means that the after-birth is found to lie at the mouth of the womb previous to the birth of the child. It goes before the child instead of coming behind. This occurs in about one case in every thousand. It happens in several varieties, which are named according to the exact part of the womb covered by the after-birth—thus, central or complete, partial, or marginal. The condition is more common in women who have had previous children, and more frequent in the poor than in the better classes. Whatever the exact variety, the great symptom and danger of the condition is the bleeding it gives rise to. As a rule this does not occur before the sixth month of the pregnancy, and is most common from the eighth to the ninth month and during the actual labour. It may not occur until the onset of the labour. It is characterised by the suddenness with which it comes on during or without any exertion on the part of the patient. It is, as a rule, moderate in quantity at first, but every now and then it is extremely profuse from the beginning, the patient losing a large quantity of blood in a very few minutes. It is often intermittent before the labour, several days intervening between the attacks of bleeding.

Cause and Source of the Bleeding.—The actual cause of the hæmorrhage is the stretching of the lower part of the womb which involves the separation of the after-birth from its attachment to the wall of the womb. Since this stretching occurs in the first stage of labour it is termed "*unavoidable hæmorrhage*." The source of the blood is partly from the blood-vessels in the lower part of the wall of the womb, and partly from the after-birth itself.

Effect of Placenta Prævia on the Patient.—Speaking generally the loss of blood will result in a paleness which increases with the amount of blood lost, the patient is restless and sighs, breaks into cold clammy sweats, and exhibits a small rapid pulse. Should the bleeding come on during pregnancy there will be a tendency to premature labour, and if the patient goes to her full time there is frequently an abnormal presentation of the child; in fact, this occurs in one-third of the cases. On the labour itself the effect is to delay the first stage and to render the patient liable to further bleeding after the child is delivered. The prognosis or outlook to the mother is always grave, but varies with the exact type of the malposition; to the child the prognosis is very grave, about half the infants in these labours being born dead.

Treatment of Placenta Prævia.—It may be said as a broad principle that delivery of the child should be completed as soon as possible after the condition is recognised, because each succeeding

attack of bleeding renders the mother's chance of recovery more remote. The exact procedure will vary according to the time of the onset of the bleeding, whether before or during labour. If possible the hæmorrhage is stopped by plugging the passages, dilating the mouth of the womb, separating the after-birth, and drawing down one foot of the child which acts as a plug. After delivery is over further bleeding must be anticipated, and the after-birth removed immediately. The whole procedure requires skilled attention.

Accidental Bleeding.—This is the second type of bleeding which gives rise to complications in labour, and it is termed accidental in opposition to the former, which is called unavoidable, because in this case the bleeding comes from an after-birth which is attached to the wall of the womb in the normal position, from which there ought not to be bleeding to any great extent. It is more common in women who have had other labours than in first labours. It may be that the bleeding takes place in such a way that all the blood is retained in the womb, in which case it is termed "concealed"; if, however, there is nothing to prevent the blood escaping through the vagina, it is termed "apparent" or "external." Accidental bleeding of this kind is caused by external violence such as a fall or blow or kick, undue exertion of the patient, some disease of the after-birth, or sometimes by the irregular contractions of the womb. The symptoms are the collapse of the patient, the feeble contractions of the womb or labour pains, the appearance of distension of the womb, and actual pain in the womb itself. All these point to internal concealed bleeding, while in the case of the external bleeding the amount of blood poured out tells its own tale, as well as the pain and collapse of the patient. The outlook is very grave, especially in the concealed type of bleeding, because the patient in this case is very often, indeed usually, extremely collapsed before the danger of the condition is accurately recognised.

Treatment of Accidental Bleeding.—If the bleeding be only slight the best plan is to rupture the membranes. Often this arrests the bleeding entirely, but after this is done a very close watch must be kept on the pulse in case there is concealed bleeding afterwards. The advancing part of the child is apt to prevent the further escape of blood which may lead the attendant to think the bleeding has ceased, when, in fact, it is retained within the womb. If the hæmorrhage be severe the one essential thing for the safety of the patient is to empty the womb of its contents as quickly as possible. Rapid delivery must be effected in one or other of the ways at the disposal of the physician.

Bleeding after Delivery of the Child.—This, the third

type of bleeding which gives rise to complications, is technically known as "Post Partum Hæmorrhage," and it may arise from two sources; first, from the site where the after-birth was attached in the womb; and second, from some lacerations of the passages. If from the site of the after-birth, the bleeding may occur before or after the placenta itself is expelled. To understand its cause it is only necessary to realise why bleeding does not happen in a normal case of labour from this source. This is because of the healthy contractility of the womb and the pains themselves which close up the bleeding points. "Dangerous hæmorrhage is thus the result of want of tonic contractility in the womb." What causes this lack of normal tone? Amongst the many factors may be mentioned the following: Exhaustion from the previously delayed labour if the labour pains have been weak, a too rapid delivery, excessive distension of the womb from twins or other cause, irregular labour pains, a partially adherent after-birth, any disease of the wall of the womb, the retention of clots in the cavity of the womb after labour is over. Any of these causes may produce accidental bleeding of this kind.

Signs and Treatment of Bleeding after Delivery.—The symptoms are usually only too marked, in that the rush of blood at once gives rise to alarm. But in some cases the bleeding may be entirely within the womb, and then it will have to be recognised by the distension of that organ, which will be at the same time firm to the feel. The treatment is both preventive and active. To prevent bleeding after delivery attention should be paid to the rules for delivery laid down under the management of normal labour, especially taking care that the body of the child is delivered slowly, and that the womb is held in the hand of the attendant after the delivery of the child. The active treatment, when bleeding does come on, is one of the most important practical matters in the whole of labour. The attendant should endeavour to grasp the body of the womb through the belly wall, and rub, knead, and compress it. If the blood is being retained this will drive it out; if not, it stimulates the womb to contract of itself, the lack of which is the cause of the continued bleeding. If this is insufficient the right hand must be introduced into the womb with the strictest antiseptic precautions, all clots cleared out as well as the after-birth if it be still therein, and then the wall of the womb compressed between the hand within and the hand outside the belly. If still the bleeding does not cease, hot water of a temperature of 120° F. must be injected into the cavity of the womb by means of a Higginson's syringe. This is almost always successful, and hot water should always be at hand for this emergency. If this does fail there is no option but to plug the womb itself.

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When the bleeding is stopped the womb must be still held firmly in the hand through the belly wall for at least half-an-hour to prevent its relaxation, and the patient kept absolutely still and quiet. A dose of ergot should be given or an injection of ergotine hypodermically.

Bleeding from Lacerations of the Passages.—Bleeding from this cause is occasionally very profuse, but it can always be distinguished from bleeding from the site of the after-birth by its occurrence coinciding with well-marked contractions of the womb. The treatment in this case is to stitch the lacerated tissue, or if in the vagina to plug that passage.

Secondary Bleeding.—Bleeding is very uncommon later than one hour after the delivery of the after-birth (if it has not occurred previously). It is especially, however, to be feared in cases of placenta prævia as above described. Anything in the shape of a copious loss of blood occurring later than a week after delivery is rare, and is usually the result of a tumour in the womb, or some clots having been retained in the cavity of the womb from the time of the delivery. In all cases of secondary bleeding the cavity of the womb should be examined for the presence of tumours or other contents which demand removal.

Retained After-Birth.—In speaking of a normal labour we stated that the after-birth usually came away within an hour of the delivery of the child. A placenta is therefore said to be retained if after the lapse of that time it remains within the cavity of the womb. This retention may be due to the fact that the after-birth is actually adherent to the wall, or it may be due to an abnormal contraction of the womb in which it assumes the shape of an hour-glass, thus preventing the escape of the after-birth. The treatment if the placenta is adherent is to hold the womb with the left hand outside the body wall, introduce the right hand, carefully sterilised, into the cavity of the womb, and scrape off the attached after-birth. This usually produces severe bleeding, so once more the hot water must be ready to deal with this complication. It may be useful to mention here that the temperature required (120° F.) for the water may be estimated roughly as that which will allow the finger to remain in it for a moment without scalding. Water cooler than this is worse than useless and only increases the bleeding. It must be hot, not warm. After the adherent placenta has been removed, the womb must be washed out with an antiseptic lotion.

Treatment of Bloodlessness.—After any of these various forms of severe bleeding the patient will of necessity be in an anæmic condition which requires attention. Her head should be kept low,

and absolute rest and quiet secured. Hot bottles should be applied to the feet, hot fluids given to drink in small amounts at a time, and if necessary, heart stimulants administered. In very extreme cases the operation known as "transfusion" has to be performed.

Rupture and Inversion of the Womb.—These are two very rare complications which may be mentioned. Rupture of the womb occurs about one in 4000 cases, most frequently in those who have had previous children. It may be caused by a contracted pelvis, a child with water on the brain causing a very large head, shoulder presentations, the non-dilatation of the neck of the womb, some severe operation done inside the cavity of the womb, and disease of that organ. The symptoms are the sudden stopping of the labour pains, a feeling of something having given way in the abdomen, great collapse of the patient, and bleeding, as well as the actual recognition of the tear in the wall of the womb. Once ruptured a serious surgical operation is necessary to repair the torn wall, or to remove the ruptured organ entirely.

Inversion of the womb is also extremely rare nowadays, when the danger of pulling on the cord, the most common cause, is recognised. The condition is that in which the womb is turned inside out partially or entirely. The symptoms are those of straining after the birth of the child with bleeding and severe shock, and the outlook is very grave from bleeding and the shock. The treatment is to remove the after-birth at once if still present or adherent, and restore the womb to its proper form as quickly as possible by means of the hand passed into the vagina, combined with the other hand operating from without. The inverted part is pushed through the neck of the womb.

Prolapse of the Cord.—This is a complication of labour which is not so very uncommon, occurring in about one in every 150 cases, and being associated with any kind of presentation, though most common in abnormal presentations. It is easily recognised by the cord appearing before the head of the child, or whatever portion of the child is coming first. It offers no risk to the mother, but is a serious matter for the child, because compression of the cord between the bones of the pelvis and the child causes asphyxia and death of the child. The treatment therefore is directed to relieving the pressure on the cord. If on examination no pulsation can be felt in the cord, treatment is unnecessary, as the child is already dead. If pulsating, the attempt must be made to replace the cord above the presenting part of the child.

Twins and Triplets.—The development of more than one child in the womb in the same pregnancy gives rise to the condition known

as "Plural Births," of which twins and triplets are the most common. More than three is an extremely rare condition and need not be considered. Plural births vary in frequency in different countries; thus, twins in Britain occur in about one in 90 labours; in Germany, one in 84; in Belgium, one in 61; in Ireland, one in 58. Triplets occur in about one in every 10,000 labours. Twins are usually under the average weight, and one twin as a rule is larger than the other. About 64 per cent. of twins are of the same sex, the sexes being about in equal numbers.

Labour in Twin Pregnancies.—In about two-thirds of all twin pregnancies the labour is premature, probably due to the fact that the womb is so much distended. It sometimes happens that one twin is born prematurely and the second carried to full time; and occasionally one dies and is expelled alone or the dead foetus may remain and shrivel up in the womb. Very frequently the fact that the pregnancy is a twin one is not recognised until the time of the labour; in fact, until the first child is born. Careful examination before labour may, however, lead to the recognition of the condition by the noting of the unusual size of the womb, and the actual feeling of two heads or hearing two foetal hearts beating. Although many twin pregnancies pass off without any complications of serious nature at the time of labour, yet there are certain dangers associated with the condition from which a normal labour is free. Thus there is more risk of bleeding, the consequences of over-distension of the womb; complications may arise from the twins becoming locked together, while to the twins themselves the outlook is not good. From the fact that many are born prematurely, and from the frequency of abnormal presentations in twin labours, a considerable number do not survive.

Management of Normal Twin Labours.—As the children are usually rather below the average size the labour is generally an easy one. After the birth of the first child the second as a rule is born spontaneously in less than an hour afterwards, and if there be great delay it will be due to the laxity of the womb from its previous over-distension. Most commonly the after-births are born after the second child, but that of the first child may come away before the appearance of the second of the twins. Both after-births may even come before the second child. It is the third stage which is the most delayed owing to the inertia referred to from distension.

After the first child is born the end of the cord attached to the after-birth should be tied in case of communication between the circulations of the twins. When the head or other part of the second twin presents itself wait half-an-hour or so for the labour pains to

appear and finish the labour. Should the pains then not come on, the womb should be rubbed and kneaded in order that contractions may be stimulated. Should an hour elapse and still no pains come on, the membranes must be ruptured and the labour hastened, as the mouth of the womb is liable to close up. It is of great importance that during the birth of the second child the womb should be compressed by the hand outside the belly wall, as this procedure helps to prevent the tendency to bleeding which there is. For the same reason the after-birth should be squeezed out soon after the birth is over. The great risk of the labour is that of bleeding during the third stage, consequently hot water should always be at hand and the patient carefully watched. In more than half the cases the second child is born within twenty minutes of the delivery of the first. If the presentation of the first is favourable the best advice is to make no interference in the first stage of the second. There must be no pulling upon the cord especially. "If the mother desires to know if she is to have another child, a knowledge which in many cases is by no means pleasant, let the truth be frankly told; she may at the same time be assured that the labour will almost certainly be brief and easy, for not only has the birth-passage been fully dilated, but the second child is usually smaller than the first."

Complex Twin Labours.—It sometimes happens that after the membranes have ruptured both heads attempt to enter the pelvic passage simultaneously, in which case the higher head must be pushed up and the lower laid hold of; or if a head and a breech present together the breech must be pushed up to prevent locking of the two chins. Where the second head enters the pelvis before the birth of the body of the first child, the first child is almost always born dead, and it must be sacrificed to save the second. The most serious complication is the locking together of the twins by the chins, in which case the attempt must be made to unlock them by pushing upwards; if this is unsuccessful the head of the second child must be delivered with forceps.

From the above remarks it will be noted that the special risk in plural births is bleeding in the third stage of the labour, and special attention is necessary at this time; otherwise the principles of treatment are the same as in a normal labour with one child. After the birth of a second child the possibility of there being a third, that in fact it may be a case of triplets, must be borne in mind. The indications in this latter case are similar to the treatment for twins, with the addition of an extra child to deal with.

We have now dealt with the most important of the complications which are apt to occur in labour, and must later turn our attention

to those of the period succeeding labour, the puerperium. We would only here remind the reader once more that although the complications of labour are many and some of them terribly formidable, still, in the vast majority of labours all goes well with both mother and child, if only ordinary intelligence, common sense, and scrupulous cleanliness be observed on the part of those who come in contact with the patient and the lying-in room. If there is any reason to fear a mishap of any kind skilled assistance should be secured with the utmost promptitude, because in midwifery there is one moment which is the right one in which to act, and which lost may mean untold harm and even death to mother and offspring.

SECTION VI

THE LYING-IN ROOM

THE lying-in room should always be decided on by the seventh month in case of accidents, and though there is no need to have it ready so far ahead, care should be taken that no infection comes near it, and that certain clean bedding is ready to hand. The choice of the room must depend on the mistress of the house; the quietest and most convenient room is the best, and of course sunlight and air are always advisable, and good ventilation is indispensable. It should have a fireplace, and should not be in connection with any water-closet or sink. But the main thing is that the room should be *clean*; any heavy curtains and needless rugs or stuffed chairs should be taken away, and a few days before the confinement is expected the room should be thoroughly spring-cleaned—carpet taken up, paint washed down, and all made as pure and sweet as possible. The bed should be placed so that both sides can be got at, and the light should strike across it. A single bed is most convenient, but too often it is necessary to put up with a double one. A hair mattress on tense wire springs is best, but certainly there must be no “sagging” in the centre of the bed, and a feather bed must be avoided if possible. Wooden laths across the bed under the mattress are sometimes useful when an old bedstead sinks in the middle. There should be no curtains or valance to the bed, and nothing whatever under the bed. The blankets must be clean, and so must all the bedding. There must be a large supply of sheets available. A case of puerperal fever has been traced to a pillow brought hurriedly from another room in which fever had been nursed, so see that there

is a clean extra pillow for the knees in case one is wanted. Be sure that there is nothing in the room that has been in contact with an infectious case.

Then having ascertained that all dangerous and dirt-collecting things have been removed, see to it that all that is wanted is ready in the room. For the bed you will want two mackintosh sheets, one to go next the mattress, and the other to go under the draw-sheet. The first is not absolutely necessary, if expense is an object, but mackintosh is not so costly as it used to be, and a sheet a yard square can be had for from two to three shillings, and a rather larger one for rather more. Then you will need an accouchement sheet of antiseptic absorbent wool, two dozen absorbent pads, a binder for the mother, and some large safety-pins. Strong roller towelling makes a very good binder; it should be one and a half yards long and about half a yard wide. Some disinfectant such as crystals of permanganate of potash, or soloids of perchloride of mercury are advisable, but it must be remembered that the first stains linen and crockery, and that the second is a powerful poison, and the soloids must be kept locked up. A douche can or enema is useful and only costs a few shillings. There are regular "accouchement sets" sold by chemists, which may be useful to the inexperienced, but as a rule a mother finds out what she needs from nurse or friends and buys the articles separately. A bed-pan, a china slop-pail, and two hand basins should be ready in the room, also a rubber hot-water bottle. It is well to have a little castor oil in the house.

So much for the arrangements for the mother. For the expected baby there must be some form of cradle, and a small stock of clothes. The cradle should be as high as the mother's bed, and should be firm—not swinging, and as simple as possible. A mattress is better than a feather bed. The cradle should not be too deep or too be-curtained or the infant will not get enough air. Bedding light, and a small mackintosh to cover the mattress. The garments should be small and simple, long robes and cloaks are not advisable. So often the elaborate garments are provided and not the little things that are wanted immediately. Some white thread and some antiseptic gauze or boracic lint for dressing the cord and cleaning the eyes are the first things the nurse will want, and then a nice clean flannel square in which to wrap the infant and put it before the fire till the mother has been attended to. Then for baby's first dressing, the nurse will need a bath, carbolised vaseline, some delicate but pure soap, a sponge, some dusting powder (such as fuller's earth or powdered starch), flannel binder, eight inches wide; needle, thread, and thimble, safety-pins, scissors, diaper, chemise, long flannel,

shetland jacket (in winter), gown, and head flannel. A soft small hair brush is desirable. Most of these things can be put ready in a basket and covered over with a clean cloth.

Then for the use of the nurse there should be a small bed, a washing-stand, a dressing-table, an easy chair for the afternoon nap, and a low chair for bathing the baby, and a flannel apron. If the baby's bath is not on legs there should be a luggage stool to put the bath on. A tea-table near the patient's bed is desirable, and just a few ornaments about the room to keep it from looking bare and desolate.

In a cupboard or chest of drawers there should be the rest of the baby's clothing, a good supply of clean sheets, and plenty of night-gowns and soft towels for the mother, and a dressing-jacket or shawl.

The fire should be laid in the grate, and a kettle on the hob. Directly labour begins the fire should be lit and the kettle filled.

No soiled linen must ever be left in the lying-in room, it must be taken away immediately. And no slops must be allowed to stand. Keep the room pure and sweet and clean; have an inch of open window at the top during winter, and a bright fire. In summer have wide open windows if it can be arranged without a draught across the bed. A screen in the room is often useful for keeping draughts off the bed, or protecting baby during the bathing time.

SECTION VII

THE MATERNITY NURSE

Advice for the Mother.—It is usual to engage a maternity nurse three or four months before she is required. Should the confinement be premature and the engaged nurse be unable to attend, part of the fee should still be paid to her, for possibly she may not get work during the month she has kept free for you. It is always better to see the nurse personally and to have the terms of the engagement in writing, and ask the nurse's advice about the lying-in room and other preparations; also ascertain that she does not snore if she is to sleep in the same room as the patient. Some doctors and mothers prefer to have a fully-trained midwife to act as nurse during a confinement, whereas others prefer the woman of experience who is untrained. It all depends upon the individual case and upon the household; where a young wife is alone all day and is nervous, and perhaps not very

strong, a trained nurse is preferable, but where the mother of seven is expecting an eighth arrival, she generally engages some experienced woman who will do as she is bid and who will indulge her mistress's fads instead of insisting on her own. We are too apt to forget that child-bearing is a natural process, and we make too much fuss about it and interfere with nature needlessly. It is not always possible to correctly pre-date a confinement: the best method is to reckon 280 days from the first day of the last menstruation, or 273 days from the date of impregnation, and ask the nurse to come to you the day before you expect. If it is a first baby, it is better to have the nurse come a week beforehand, as labour is generally earlier in these cases. The period of waiting after the nurse is in the house is wearisome. You may ask the nurse to do some needlework for you, but it is not correct to ask her to do any housework beyond keeping her own room tidy. The nurse should not take her meals in the kitchen; let her have them alone, or with the housekeeper, or with you. Attention to these small details largely helps to make matters work smoothly, and if it is more trouble to give the nurse her meals separately, still it spares a lot of gossip: there is always bother when there is undue familiarity between the nurse and the servants.

Advice to the Nurse.—The nurse must avoid frightening or distressing the patient with tales of other cases. It is her duty, especially with a young wife, to keep the conversation bright and serene, and, whilst giving all the information necessary, to keep a high tone with regard to the duties and privileges of motherhood. It is very difficult for some nurses to remember that what are common subjects of conversation to them are very distressing to a refined and inexperienced young wife; be sure, therefore, to respect the sensibilities of your patient. The night before she expects to be confined the patient should take a warm bath (not more than 100° F.), and a mild aperient if there is any constipation. Especially is it necessary to be quiet and kind when the first pains begin and the household is liable to get distracted and upset, and the patient relies on the nurse to see that all goes well. Note the time of the first pain, then go and light the labour-room fire and see that the bed is ready, spreading the wool sheet over the top mackintosh. Send a *written* note of warning to the doctor stating the exact hour of writing. There will probably be several hours of waiting during what is known as the "first stage" of labour, and during this time the pains will recur at intervals. Between the pains the patient should move about, she should also be fed and made as comfortable as possible. It is well to get her into a dressing-gown and get any elaborate coiffure undone. The doctor will probably come at once in response to the note,

make an examination, and then, judging how long the labour is likely to be, go away and return in a few hours. Just ask him at the first visit if there is anything he specially wishes got ready, and where he is to be found if he is required in a hurry. If the patient's bowels have not lately been emptied give a simple enema; wash the vulva and thighs well with some antiseptic soap.

Towards the end of the first stage of dilatation of the cervix, which usually lasts from four to six hours, get your patient into a night-dress under which is a *clean* flannel petticoat, and put on her a dressing jacket or short bed-gown. Let her keep on her stockings. She had now better lie down on the bed; the night-dress should be rolled up under the arms and kept clean and ready to pull down when all is over. A drink of water or cup of tea may be given if wanted. Sometimes there is cramp of the limbs and a little shivering about this time, and the patient may want to go to stool; this must not be allowed, as the child may be born in the chamber. It is advisable to spread a newspaper or piece of brown paper over the carpet to the right side of the bed where the doctor will stand.

The second stage of expulsion only lasts about an hour, and the doctor should be present all the time, and the nurse has simply to wait on him and do as she is told. But she must remember that her hands must be antiseptically clean if she is to hand things to the doctor; therefore let her wash them well and scrub her nails, and then soak her hands in a solution made by dissolving one of the $8\frac{1}{4}$ grains corrosive sublimate soloids in a pint of warm water. Let her put on a clean apron and turn up her sleeves. If there is any brandy in the house it is as well to have it in the room, also two tumblers and a teaspoon.

As the pains get worse, the nurse can often ease the mother by pressing her hand against the small of the back. She can also encourage her by telling her that her troubles are nearly over, and by general sympathy. In first cases the doctor often tells the patient to cry out, as if she holds her breath and bears down, the child may come through too quickly and tear the perineum. Some doctors order the nurse to bathe the perineum with warm water or rub it with antiseptic vaseline so as to soften it that it may stretch more easily. But whatever the nurse does for the patient, she must not disturb her when she falls into brief dozing between the pains, for these little rests give strength to help the labour on. The kindly nurse will also give a word of encouragement to the household, and see that meals are not being neglected.

As the child is born, the nurse will receive it in a flannel square, and when the doctor has wiped its eyes, she will wrap it up and put

it in front of the fire, and return to wait on the doctor until the third stage is completed; that is, the placenta is expelled. This should not take more than fifteen minutes, but during the time the nurse must never forget the baby, and must take a peep at it sometimes to see that it is warm and that there is no bleeding from the cord.

Hold a basin for the doctor to put the placenta in. Watch how the doctor puts on the binder, and hand him the safety-pins as he wants them. He will probably order the mother a drink of warm milk at once; and he will want to weigh and examine the baby before he leaves.

Get the room tidy, clean, and quiet; remove all soiled things out of the room, and tell your patient to go to sleep whilst you are dressing the baby. Give her a hot bottle to her feet if she is cold. The placenta must be burnt; this is best done in the kitchen stove when the servants have gone to bed.

Having got the room quiet, doors closed, and all you want for the baby to hand, put on your flannel apron and sit down in front of the fire to do the first toilet. If there is much cheesy matter on the infant you had better rub it well with vaseline, and then wash it first in a basin of warm water before putting it into its bath. The temperature of the bath should be 100° F., and should be tested with a bath thermometer. The manner of lifting and handling a baby can scarcely be explained in writing; but remember to turn the child about as little as possible, and always support the back, head, and neck with one hand well spread out. The usual method of lifting a baby into its bath is to put your left hand under its back, with the thumb and first finger round the neck, and the other fingers well spread down the spine, and then take the feet between the fingers of your right hand. When the child is in the bath wash it well with your right hand, still supporting the head and back with your left hand. It is most important that the first bath should be swift and the child not get chilled, so do not worry too much about getting all the cheesy matter off. Weakly babies are sometimes not washed at all, but rubbed over with warm oil and wrapped up in cotton wool, and so saved the fatigue of the toilet and the risk of cold. Lift the baby on to a warm, soft towel on your knee and dry it with gentle dabs, not with vigorous rubbing. Dust some powdered starch into the folds of the skin, and rub some vaseline round the anus and inside of the thighs. Cut a piece of antiseptic gauze 4 inches square, make a hole in the middle, and draw the cord through the hole. If the doctor has only tied the cord once, tie it again towards its end, as a precaution against hæmorrhage (bleeding). Dust a lot of starch on to the gauze square and fold the cord down on it, and

then fold the edges of the gauze over the cord until it all makes a neat pad over the umbilicus. Now sew on the binder so as to give gentle pressure over the pad, but leaving it nice and loose at the top over the child's ribs. Then put on diaper and garments in due order, and as quickly and neatly as possible, using no pins save two safety-pins to pin up the ends of the flannel over the feet. Never use a mackintosh over the diaper. As soon as baby is finished give it to the mother to put to the breast, as this early suckling is said to help the uterus to contract. See that the mother is all right, and is not losing too much—signs of excessive loss are sighing, faintness, pallor, a thready pulse. Then clear away the baby's bath, and you can probably let the husband or friend come and sit quietly in the room for ten minutes whilst you go and get a needed cup of tea; but you must not be out of call.

The Care of the Mother.—Throughout the next four weeks the nurse has to maintain a serene and pleasant atmosphere in the lying-in room: this is not merely a question of letting in fresh air, but of shutting out all worry. The day's work should be regular and orderly, yet without too much dictation, or giving the impression that the place is a hospital ward, and that there is "illness." One of the servants should do the grate, and should fetch and carry for the nurse; but the nurse should do her own dusting, and should so arrange that the fetching and carrying is only twice a day; that a regular stock of fresh linen, &c., is brought up in the morning with the hot water, and that the food, &c., for the night is all brought up on one tray. In the middle of the day the nurse can well go down and fetch up her patient's meal herself; but it is not a good thing for her to be always running in and out of the kitchen, nor yet should she be always ringing the bell. The old theory of starving the mother is no longer fashionable; but for the first two days the patient will probably prefer a light dish of soup, milk-puddings, tea and bread and butter, and eggs. As soon as she fancies a little fish or chicken she may have it, unless there is a high temperature. After the fourth day chops and the usual diet are allowable, care being taken not to go to the other old-fashioned extreme and stuff the mother to indigestion point under the belief that it is good for the baby!

Keep the bed fresh and clean for the first two or three days by pulling through draw-sheets, or gently drawing patient from one side of the bed to the other (see section on Home Nursing, vol. iv. p. 171ff.); but the patient must not be allowed to sit up until the doctor gives permission. About the end of the second week the patient can generally be lifted on to a couch or easy-chair whilst her bed is

made; at the end of the third week she can generally be dressed, and spend the day on the sofa. Allow no visitors for the first ten days, if possible, and when they do come, don't let them stay long or interfere with the afternoon sleep. Give plenty of time to your patient's toilet in the morning, wash her well, do her hair as nearly as you can in her accustomed way, and make her look dainty in every respect. As she gets better see that she does not tire herself too much over dressing—always be at hand to help her.

The doctor may ask you to take the patient's temperature night and morning, and will most certainly expect you to note the state of the bowels. There is often constipation after labour, but this must not be allowed to go beyond the third day, when castor oil may be given if necessary. Do not let the patient take patent pills without the doctor's permission. Often a feverish attack in a lying-in patient can be promptly cured by securing an action of the bowels. On the third day when the inflow of milk to the breasts comes on there is often a rise of temperature, and the mother gets hot and flushed. A feverish attack, together with scanty and offensive lochia, and suspicion and fear on the part of the mother, may mean oncoming illness, and needs at once reporting to the doctor. The "lochia" is the discharge from the uterus, and it is profuse and red in colour for the first few days, gradually getting less and fainter in colour, till it ceases about the tenth or twelfth day. It should be received in pads of absorbent wool, which should be burnt when soiled. If any membrane or clots appear on the pads, the doctor should be told.

The Douche.—Some doctors like their patients to have a douche directly after labour, and every morning for the first week. Unless a nurse is careful and skilful she may do more harm than good with this, for it is absolutely essential that the douche nozzle, the nurse's hands, &c., should be aseptically clean. The usual instrument is an enema syringe, with the long nozzle fitted. The nozzle should be soaked in 1 in 2000 corrosive sublimate, and then lubricated with a little carbolised vaseline. The douche should consist of two pints of disinfectant fluid at a temperature of 100° F. Ask the doctor what disinfectant he wishes used: a few crystals of permanganate of potash is the safest, just sufficient to make the water a deep red, only be sure the crystals are thoroughly dissolved. One in a 1000 corrosive sublimate, or 1 in 4 iodine are sometimes used, or one teaspoonful of creolin to a quart of water may be preferred. Remember to be very careful in dealing with disinfectants, and very exact as to the preparation of solutions. Before giving the douche see that your syringe is working properly; put the patient on a bed-pan or slipper; wash the vulva with a piece of absorbent wool dipped in disinfectant.

Insert the nozzle gently, squeeze the ball of the syringe slowly and regular until nearly all the fluid is used. Be sure and keep the entrance end of the syringe well down in the water so that no air can get in. No one should try to give a douche without being shown; theoretical teaching is not enough. Withdraw the nozzle; press the hand gently on the uterus to squeeze out any remaining fluid, dry the vulva with some cotton wool, and remove the pan or slipper. Notice if any clots or membrane come away in the douche water. A tin reservoir douche-can to hang on a nail above the bed is a saving of trouble, but is not so usual in private houses as is the Higginson's syringe. Wash the nozzle and put it to soak in 1 in 2000 corrosive sublimate. Sometimes a hot douche is ordered to allay the after-pains that are so tiresome in some cases; then the water may be 102° or 103° F., and the quantity only one pint. Gentle friction or a hot bottle over the uterus may also be useful, but the doctor should be consulted. After-pains are not continuous, and are most common where there have been many children. The nurse must be very careful to wash the patient's breasts and nipples, and to support the breast at the side with a bandage coming round from the back, and in front split in two—one part to go under the breasts, and the upper flaps to go over the breasts. In very pendulous cases a sling round the neck and under the breast may be necessary. If the breasts are very large and full the mother should not be allowed to sit up whilst she is suckling the baby. The child is not fed by the breast if it is too weak to suck, if the mother suffers from constitutional disease, or if the milk does not agree with the baby. Then it becomes necessary to relieve the painful fulness of the breasts, and in the case of the first cause, the common treatment is to draw off the milk by a breast pump and feed the child with it with a spoon. If it is wanted to dry up the breast, a belladonna plaster and somewhat tight bandage may be ordered.

The Nipples.—If the child is suckled, always wash the nipples before and after with a little warm water, into which a few drops of boracic lotion have been put. Draw out the nipples—with a nipple shield or exhauster if necessary—and put the child to the breasts alternately, not to both breasts at one meal. It often needs patience and care on the part of both mother and nurse to get the infant to suck properly. If the milk does not flow readily, stroke the breast gently from the outer ring towards the nipple. If the nipples get sore and cracked they can be dressed with Friar's balsam, and a shield used; a glass shield is best, it is more easily kept clean, and you can see how much milk the infant is getting. If the nipples are touched with glycerine after washing it will often save them from cracking.

If the patient has difficulty in passing water, put some hot water in the bed-pan, so that the steam may come up about the parts and help them to relax. Sometimes if a patient gets up on her hands and knees she can micturate, but this must not be done without the doctor's permission. If water is not passed within eight hours after labour, tell the doctor.

The mother's diet should be simple and nutritious: tea, coffee, vinegar, and strong drink should be avoided. So should patent medicines. Do not give stout except under doctor's orders. If the mother gets indigestion or liver attack, the child will suffer.

Young mothers are generally very nervous and easily upset during the lying-in period, which is the more reason why the nurse should always be calm and patient. The nurse would do well to read the section on "Complications of the Puerperal State" (page 66) if she is not satisfied with her patient's progress.

Care of the Child.—Infants are very feeble folk, and a nurse must remember how tiny is their flame of life, and how swiftly the least chill or carelessness may result in death.

Putting the child to the breast directly after its first toilet stimulates the secretion of milk and draws out the nipples; also this first milk, which is called colostrum, is purgative in action, and helps to get rid of the dark sticky stuff (meconium) with which the child's bowels are loaded at birth. For the first two days the child need only be put to the breast three or four times in the twenty-four hours; but after the milk comes in on the third day the child should be fed every two hours during the day, and when it wakes and cries at night. During these first two days the infant loses weight: the normal weight at birth is 7 lbs., and after the milk comes in the child should gain 2 ozs. a day. Fifteen minutes is long enough for a nursing. After each nursing the child should be put into its cot, and should have a good sleep. Place it on its right side; if it is on its back and is sick, some of the curd may return to the throat and cause choking. The child should sleep in its cot always; there is the danger of over-laying if it sleeps with the mother. Especially may pendulous breasts smother a child if the mother goes to sleep whilst suckling. Even a head flannel getting across the mouth when the child is in its cot has led to suffocation, or carrying a child out with a shawl over its head. The little lungs are so small, and hold so little air, that the least thing smothers an infant.

If a child has to be brought up by bottle, the easiest plan is to get the bottles ready prepared from one of the modern milk depots; then all that remains to be done is to stand the bottle in hot water

for five minutes beforehand, to uncork and fit on the teat, and then feed the child. In most big towns these depots are run under municipal management, and they have done much to reduce infant mortality. The milk is sterilised, and can therefore be sent out to country districts, where parents can afford to pay for it. Failing a milk depot, the nurse must get two bottles with teats directly attached and use them alternately, keeping them soaking in clean water when not in use, and scalding them out with boiling water after each meal. If cow's milk can be obtained from some farm near, the arrangements of which can be inspected, there is no need to sterilise the milk; but if the milk is got through a shop, and the source of supply unknown, buy a milk steriliser (one pint) or milk pasteuriser, and heat to 160° , according to the directions which will be given you with the steriliser. This does not alter the milk to the extent that boiling does, and yet it kills all germs. Nor does sterilised milk require diluting with water to such an extent; but for ordinary cow's milk it is usual to add two parts of water to one of milk for infants under six months old, and two parts of milk to one of water afterwards. A little sugar should always be added, and lime water or barley water may be tried at the doctor's discretion.

During the second and third weeks the infant should be fed ten times in the twenty-four hours, and take about 2 oz. at each meal. Remember that a weakly child will sometimes be half-starved if mother or nurse are not persistent enough in making it suck. Wash the child's mouth out with *weak warm boracic lotion after each feeding*. A baby should gain slowly in weight, should sleep quietly, and its motions should be of the colour and consistency of custard if it is doing well. The bowels should act two to four times in the twenty-four hours. Diarrhoea should be at once reported to the doctor, as it is terribly fatal to infants. It is often caused by dirty surroundings, soiled napkins not being changed at once, or the bottle or teats not thoroughly cleaned; attend at once to hygienic measures if the stools get loose and greeny in colour.

It is not well for the monthly nurse to wash out the napkins in a house where there are servants who can do it; it is so very important that the nurse should keep her hands absolutely clean. If it is explained to the mother that it is not laziness but consideration for the child and herself she will recognise this. But on the other hand, in a poor household the nurse should certainly rather do a little washing herself than run the family into expenses they cannot afford. But under no circumstances put on a napkin that has been merely dried without being washed. Before the monthly nurse leaves a

case she should have instructed the mother, or incoming nurse, in the washing, dressing, and feeding of the child, and should try to leave behind her not only practical experience of the proper methods of dealing with infants, but also a high ideal of the privileges of maternity and of its duties. By her own consideration and care for the child the nurse can teach others to regard it as of immense importance as the potential man or woman of the future.

If it so be that the infant dies, it is the duty of the nurse to lay out the little body, dressing it in one of its own little robes, and letting it look as natural as possible. But the nurse must be most careful to disinfect her hands and forearms afterwards, and to put on a clean gown and apron. Nor should she go to another case within a week, and then she must be sure not to wear any of the garments worn at attending to the dead child. The swift illnesses of babies makes it well for a nurse to know that in emergency a layman or a woman can lawfully baptize. Thus the father, doctor, or nurse if desired, can name the child, sprinkle it with water, and say "I baptize thee in the name of the Father, and of the Son, and of the Holy Ghost." The sprinkling with water and the invocation of the Trinity are essential. This brief ceremony secures that religious service may be performed over the body at its burial if the parents wish it.

SECTION VIII

COMMON DISEASES OF WOMEN

Introductory.—We have now to turn our attention to an entirely different aspect of our subject from that which has occupied us in preceding pages. We have considered the special anatomy of the woman, the natural and abnormal phases of her menstrual periods, the phenomena of normal and complicated labours, and the diseases which interfere with due recovery from childbearing. There still remains a large group of morbid conditions which are not directly connected with pregnancy, but which are more or less associated with the female organs of reproduction. The whole subject is termed technically Gynæcology, and it embraces a very wide field, too wide for detailed consideration in the space at our disposal. We shall therefore confine our attention to the more important and common diseases and ailments of women, a simple knowledge of which it is of advantage to the educated woman to possess.

DISPLACEMENTS OF UTERUS.



ANTEVERSION (Slight).



ANTEVERSION (Marked).



RETROVERSION



RETROVERSION.



PROLAPSE.



PESSARY in position supporting UTERUS.



Sterility.—First of all we may deal with that condition on the part of a woman which renders her incapable of conceiving; what is called sterility. It corresponds to that condition in males in which a man is incapable of begetting a child. Frequently the term is used in a less precise sense, and women are said to be sterile who have borne no children after several years of married life, but the strict meaning of the word is as stated. A woman may be fertile and still not bear children; her husband being responsible for her not conceiving, either because he is impotent, sterile, or because artificial precautions are taken to prevent conception.

Causes of Sterility.—It will conduce to clearness if we remember that in order that conception may occur certain conditions must be present in both male and female. The male must produce healthy spermatozoa, and be able to deposit these in the female genital passages. The female must produce healthy ova, and must have a healthy open channel of communication from the vulva to the ovary. These two latter points may be termed the actual *local* conditions necessary for conceiving. But there are also some *general* influences apart from these local conditions which have a bearing on sterility, and concerning which we may say a word. "Amongst general influences we note first of all the effect of *temperature* and *climate*, and of marriage between near relations. Under *want of sexual agreement* have been placed many cases which have not been explained otherwise (such as the classical one of Napoleon and Josephine). *Age* has an undoubted influence." Marriages made before twenty and after twenty-five years of age are less fertile than those made between those ages. Disturbances of nutrition are seen to cause sterility, as when a patient becomes extremely fat, which appears to interfere with the reproductive function. Girls with chlorosis are sometimes, but by no means commonly, sterile. The association of sterility with painful menstruation is seen commonly in practice; in fact, it is observed in about half the cases of female sterility. The local causes, as above stated, are either conditions of defective ovulation, or the non-production of healthy ova. These two groups may be noted separately.

Sterility from Non-Production of Healthy Ova.—By the term "healthy ovum" is meant an ovum which under normal conditions is capable of being fertilised by the male reproductive elements, and capable of subsequent development. The usual period during which such healthy ova are produced is from the age of fifteen to that of forty-five years. During that time defective production may be due to congenital absence of the ovaries, to disease of the ovaries, or to constitutional conditions. Congenital absence of the ovaries is

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very rare, and is usually associated with other great malformations of the body. The ovaries are, however, sometimes under-developed, in which case the womb is generally in a similar condition, and the vagina small. Sterility is here quite beyond the reach of treatment. Disease of the ovaries is a common cause of sterility, the most common forms being inflammatory disorders, abscess, and cysts or tumours in the ovary. If both ovaries are affected sterility is almost certain to follow. The treatment in such cases is the removal of the ovary or ovaries (ovariotomy), a procedure obviously directed to the tumour or other condition, and not to the removal of sterility. The latter is absolute in these cases.

Sterility from Constitutional Conditions.—Many of these cases are very obscure as to their origin; but it does happen that a woman whose husband is healthy, and whose reproductive organs are all properly developed and free from disease, is still sterile. Such patients may be thin and emaciated, but more often extremely fat. They may be the victims of alcoholism or the morphia habit, both of which are well known to exert a hostile influence on conception. It may be that the powers of reproduction are exhausted. Some women bear a child soon after marriage and not afterwards. Want of sexual affinity, as mentioned before, is seen to have been the cause in cases where a husband and wife have been divorced after a childless marriage, and each becomes a parent when married again. In most of these constitutional conditions no definite reason can be given for the sterility, there being no obvious reason why conception should not occur, and the advice of the medical attendant can often go no further than urging a good hygienic mode of life, with abstinence from any special indulgence that may be suspected or known.

Sterility from Local Defects of the Genital Passages.—A considerable variety of causes operate here, and cover the majority of cases. In the first case there may be some obstruction in some part of the genital tract, and any closure of any part of the channel from the vulva to the ovary will obviously interfere with conception, the sperm and the ovum will be unable to meet. Any part of the vagina may be thus closed, but usually this occurs at the orifice. This is a congenital condition (imperforate hymen). The closure of the vagina may prevent coitus, but if it be at the upper part of the vagina coitus is possible, but the spermatozoa cannot reach the uterus, and so sterility results. Of course, in the lower obstruction sexual intercourse is impossible. The treatment in this latter case is to incise the obstructing membrane, but this is not always successful, as the closure may have affected the upper genital passages, from keeping the menstrual products from escaping. Then there may be a congenital narrowing of

the neck of the womb, or more commonly such a condition resulting from inflammatory conditions or caustics applied to that part. Even if this be dilated, sterility usually persists. All these conditions cause inevitable sterility if left alone, and if treated, the case is still almost hopeless from the sterility point of view. But a number of other cases are due to inflammations of part of the passages, and in these proper treatment gives a fair prospect of the sterility being removed. Such cases are slight inflammations of the vagina, of the lining membrane of the womb, or of the Fallopian tubes. These are treated by rest in bed and douches applied to the passages, with temporary abstinence from intercourse. If severe and chronic inflammation of the womb has occurred, the operation of "curretting" may be employed.

Sterility from Morbid Conditions of the Womb.—In a few cases sterility is associated with defective growth of the womb or some actual malformation of that organ, in neither of which is there much hope of its removal. Much more common is the condition of tumours in the womb, which are a constant source of sterility. At any rate they are constantly found in cases of sterility, whether they play a great part in causing that condition or not. These tumours are known as "Uterine fibroids," and are composed mainly of muscle tissue. They are common in women, and, if large, they form a serious complication in pregnancy, so that sterility is almost desirable. Most common of all, as causes of sterility from the womb, are displacements of that organ, which can be treated successfully, and leave the patient quite fertile. We shall deal with these later.

Summary of the Causes of Sterility.—We may sum up the causes of sterility in the female as follows: Absence of the ovaries; under-development of the ovaries; disease or tumours of the ovaries; constitutional causes; extreme youth or old age; closure of some part of the genital passages; defects of the lining membrane of the passages; under-development of the womb; tumours of the womb; inflammations of the lining of the womb; and displacements of the womb.

Diagnosis of Sterility.—When it becomes necessary to inquire into a case of sterility with a view to ascertaining the precise cause, and whether there is any hope of curing the condition, the chief matters to attend to are the following:—The character of the menstrual periods and when they first appeared; the presence or absence of the normal sexual feelings; and especially whether there is any history of gonorrhœa or syphilis. The general health will be noted, and the reproductive organs examined for any congenital or acquired deformities. If all the organs are healthy and the history throws no light on the cause of sterility, the conclusion will be either that it is a case

of defective ovulation, or that the fault is on the part of the husband ; or that intercourse has not been effectively accomplished. In spite of every careful inquiry and examination, it will sometimes happen that no evident cause can be found, and the patient must be told that such is the case—namely, that there is no obvious reason why she should not conceive.

Treatment of Sterility.—"In the treatment of sterility we must take a broad view of the causes, and not allow local conditions to influence us unduly. Attention to the general health, and patient waiting until at least three years of married life have passed, is all that is required in the large proportion of cases. Entire cessation of intercourse for several months should be recommended, and can be secured by change of air to some watering-place at home or abroad, according to the patient's means. Where coitus is impossible or painful, operative interference is called for immediately, and such cases offer the most satisfactory results in treatment." (Hart and Barbour.)

When we find only some condition of doubtful influence in the causation of sterility, the husband should be examined before any treatment is carried out on the wife. It is a too common assumption that in cases of sterility the fault is on the side of the woman. In an analysis of 250 cases, information concerning the condition of the husband was obtained in seventy-two instances, out of which fifty of them were shown to be responsible for the sterility of their wives. The cases in which the condition of the man was inquired into were those in which there was no cause of sterility to be found in the woman. In twelve cases nothing could be found in either husband or wife which threw any light upon the existing sterility. Thus in the whole series one case in every five of sterility was found to be due to some fault on the part of the husband.

The natural hope of every healthy woman is to become a mother, and there is no more distressing cause of lifelong misery and disappointment than that of sterility. Fortunately, by careful investigation, quite a number of the causes are amenable to treatment, though a number remain which are beyond medical skill. But so important is it for the happiness of the woman in most cases, that every case should be thoroughly examined. Most medical men can tell of cases in their own experience in which, after many years of disappointment, and when all hope of offspring had been given up, some simple treatment has been the means of bringing about all that is desired.

Changes in the Position of the Womb.—A large number of the more common ailments of women come under the general heading of "Displacements of the womb." It must be remembered that the uterus is not a fixed organ, but a very movable one. It is, as it were,

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merely slung in position by supporting structures, and is easily diverted from one position to another. These movements depend upon the conditions of other organs, whether the bladder be full or empty, whether the bowel be full or otherwise, whether the lungs are in inspiration or expiration, and upon the general position or movements of the woman. Now, all these normal variations in its position, or any of them, only become morbid or diseased conditions when the natural mobility of the womb is prevented or destroyed; in other words, only when the womb becomes more or less *fixed* in any one position. From a number of causes this does happen quite commonly, and the different conditions which then arise are named according to the direction the womb takes, whether above or below its normal level, to the right or left of the middle line, whether the displacement is total or partial, and so forth. So we speak of Elevation, Descent or Prolapse, Anteversion or Retroversion, Anteflexion and Retroflexion, and other minor permanent displacements. We shall consider the most important of these.

Elevation of the Womb.—If the healthy womb which is not pregnant is above the true pelvis, it is at an abnormally high level. This is caused not by the womb itself as a rule, but because something else is pushing it up from its proper position. All tumours which are growing beneath the womb or at the side may do this; they either push it up, or growing upwards themselves, draw the womb after them. This elevation is always accompanied by some twisting of the womb. The treatment consequently is not directed primarily to the womb itself, but to the cause of the displacement—the tumour, or whatever else is the exact cause.

Descent or Prolapse of the Womb.—If the neck of the womb is found below the narrowest part of the pelvic cavity, near the outlet, the condition is termed a descent of the womb. If a part of the womb has passed down the vagina and protrudes outside the external genitals, it is a prolapse, partial or incomplete if some of the womb is still in the pelvic cavity; total or complete if the whole body of the womb has passed out of the pelvic cavity. It is really a downward displacement of part of the floor of the pelvis.

Causes of Descent of the Womb.—Falling of the womb or prolapse is most common during that portion of a woman's life when she is bearing children, from twenty-five to thirty-five years of age, where the falling has been preceded by a relaxation of the passage of the vagina, and also by stretching of the soft parts of the pelvic floor and the ligaments which normally support the womb in position. It generally results from a number of causes, all partly contributing to the descent. Amongst these are lifting and carrying heavy

weights, digging ground (in rural patients especially), and severe manual labour generally. Then the womb may be driven down from above by tumours just as it may be driven up. Also the pressure of dropsy in the belly may force it down; and it has been said that tight-lacing has the same effect of driving the womb downwards, though the effect of this procedure is doubtful in this particular direction. The fact that it is more common in the poor than in the richer classes is probably associated with the more severe physical work in the former. But it is common in *old women* of all classes.

Symptoms of Prolapse of the Womb.—In acute prolapse of the womb there are strong pains of a bearing down and cutting nature, with feelings of great weakness and prostration. Walking and standing are both painful and difficult. The patient complains of “something coming down in front.” There is a general difficulty in passing the water. The womb itself is enlarged. When the condition has become chronic, the bearing down and the descent of the womb causes great discomfort from distending the vulva during any movement on the part of the patient. Yet, in spite of the great displacement, in some cases all the symptoms occasion but slight complaint. Constipation often accompanies, and is indeed one of the causes of, prolapse. If the condition is not attended to the womb becomes more and more congested, and therefore increases in size, more irritation is occasioned on its surface which cause superficial ulcerations to appear, and an offensive discharge from the vagina follows.

Treatment of Prolapse of the Womb.—There are two methods of treatment of falling of the womb; one by means of some mechanical support (a method dating from great antiquity), and the more recent method of treatment by an operation. This latter has come into vogue on account of the unsatisfactory nature of the results obtained by the mechanical support. Still many cases can be cured without operation by the use of pessaries and general treatment, but a great number cannot. In the treatment of cases of labour we insisted upon the grave results which might follow upon the patient leaving her bed and getting about too soon, results which, as we there said, were only found out when the mischief had been done. Falling of the womb is one of those results, and here again we draw attention to the importance of the patient keeping to her bed for at least ten days after a labour. Similarly, after an abortion she should not do any hard work for some weeks. The mechanical means of support, or pessaries, are of many varieties—good, bad, and indifferent. The so-called ring-pessary is useful in slight cases of descent; it is made of pure rubber. After each menstruation the pessary should be thoroughly cleansed in an antiseptic lotion before being replaced.

The patient easily learns how to remove and replace it herself. Various other shapes of pessaries are used for different degrees of prolapse by various practitioners, the selection of which should be left to the physician who examines the case. If the condition does not improve, the advisability of having an operation must then be considered. The details of the different operations do not concern us; we may simply state that they are directed to giving support to the womb in one way or another.

Displacements of the Womb.—We have already seen the womb can be displaced as a whole, as in falling or prolapse. It is obvious, however, that there are two other ways in which alterations either in shape or position of the womb may take place. First, the different parts of the womb may alter their positions in relation to each other; and, secondly, the womb

may be twisted round on itself or rotated. The parts which change their relative positions to each other are the neck and the body of the womb. Any alteration in the relative position of the neck to the body gives rise to a *flexion* or bending of the womb. The result of such an alteration is a change in the curvature of the long axis of the womb, or, in other words, in the direction of the canal of the womb. On the other hand, any twisting, or turning, or rotation

of the womb gives rise to what is termed a *version* of that organ. If the reader will now carefully examine the illustrations of the position and shape of the normal womb in this volume, and then compare those with the illustrations here appended of the alterations in that position and shape, it will be at once seen that the following are the chief alterations which occur:—The usual curvature of the womb may be permanently and considerably exaggerated (anteflexion); the womb may be straightened instead of having the usual curve (anteversion); the direction of the womb may be backwards (retroversion); and it may not only be turned backwards (retroverted); but in addition the usual angle may be reversed (retroflexion), thus producing a double alteration.

Anteversion and Anteflexion of the Womb.—A slight degree of anteflexion is the normal condition of the non-pregnant virgin womb; it only becomes a morbid condition when permanently exaggerated and less movable than normal. The position of affairs

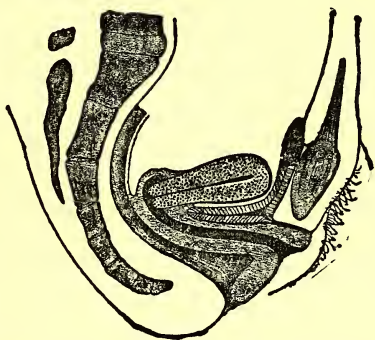


FIG. 11.—Extreme Anteversion of the Womb.

is seen better in the illustration (Fig. 11) than any description can explain. Looking at this illustration it is noted that the morbid change consists in a straightening out of the normal curve of the womb. The usual angle of forward curvature is gone, and the neck of the womb points almost directly backwards. The cause of this condition is usually enlargement of the womb from a chronic inflammation, and this may be due to the womb not having diminished properly after labour, or to inflammatory conditions of the pelvis. There are no characteristic symptoms of the anteversion itself apart from those of the conditions causing it, and these have been already dealt with. The treatment is also to be directed to the causes, and, in addition,

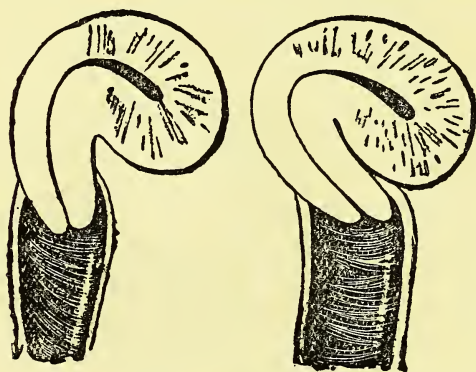


FIG. 12.—Anteflexion of the Womb.

certain special pessaries are used to replace and keep the womb in position.

Anteflexion, as already stated, is merely an exaggerated normal position, as may be seen by comparing the illustration of the normal womb with the illustration here given of anteflexion (Fig. 12). The bending is seen to occur at the upper part of the neck of the womb, or where the neck joins the body (*fundus*) of the organ. This anteflexion

is occasionally congenital in an imperfectly developed womb. When acquired it is commonly caused by inflammatory changes taking place behind the womb. Adhesions are formed in the connective tissue which drag the womb out of its proper position. The most important results of this unusual bending or anteflexion are painful menstruation and sterility, in addition to which there may be excessive vaginal discharge and profuse loss of blood at the menstrual period. No symptoms may be complained of, unless the sterility draws attention to the condition. The painful menstruation is due either to the difficulty of the escape of the blood, or to a congested condition of the womb. The sterility is probably due to inflammation of the ovaries or Fallopian tubes accompanying this condition. The treatment consists in placing the womb in the proper position after all complicating causes have been got rid of; indeed, the inflammatory conditions of the pelvis are generally the point to which treatment is directed. Some advise pessaries, others condemn their use.

Retroflexion of the Womb.—The condition which is described under this term is really a compound one, involving both retroflexion

and retroversion. It is a very important condition, and it involves the following changes in the womb, which will be best grasped by consulting the appended illustration. The womb is bent or flexed on itself, the angle varying in different cases; the size of the womb is increased; the neck of the womb is directed downwards and forwards, or else exactly downwards; and the hinder part of the neck (the posterior lip) may be enlarged.

Causes of Retroflexion.—This condition is much more common in women who have borne children than in those who have not, and, in fact, it is largely due to the conditions of the puerperal period. The womb is large and lax after labour, and any exertion or pressure then will be inclined to cause a backward displacement of the body of the womb. So here is another condition caused by too early getting up after childbirth. Most cases arise from neglect of this precaution.

Symptoms of Retroflexion of the Womb.

—The patient complains of great weakness in the back and pain on passing her motions. There is discharge from the vagina, great pain at the menstrual periods, and a profuse discharge at those times of blood, considerably more than is normal for the particular individual. Very frequently the patient is sterile, and if conception does occur the pregnancy is apt to be brought to an abrupt conclusion by an abortion taking place. The symptoms, therefore, are continuous constitutional ones, then those associated with the menstrual period, and, thirdly, those connected with reproduction and pregnancy. All these are not so much due to the displacement itself as to other morbid changes associated with it, to weakness or over-stretching of the tissues of the womb and its supporting attachments, as well as inflammation of its lining membrane and its muscular substance. Of all these symptoms weakness in the back is the one most commonly found, and of which there is most complaint. The discharge is due to the chronic inflammation of the lining membrane of the womb, the mucous secretion is increased from congestion at the menstrual periods, and, by degrees, continues without cessation. When a patient states that she has had a child several years ago, and that since that time she has suffered from considerable pain in the back, discharge, painful and profuse menstruation, and

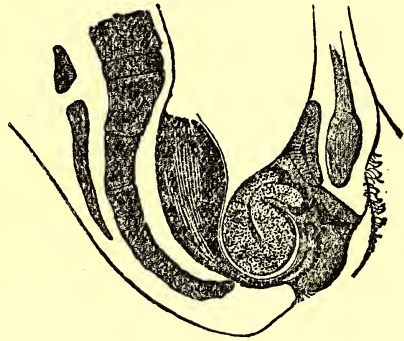


FIG. 13.—Retroflexion of the Womb.

that she has not conceived since, then this state of retroflexion of the womb must be suspected. The abortion which takes place is due to the inability of the womb to assume its right position, or else to the morbid condition of its lining membrane, which prevents the ovum from becoming properly attached.

Treatment of Retroflexion of the Womb.—The very first thing which obviously is required is the replacement of the womb in its proper position, and this will depend upon whether there is any inflammation present, and on whether the womb has become fixed in its unusual position. The inflammation is treated by blistering, hot water injections, and the use of the glycerine plug, all of which may have to be continued over some weeks before any attempt can be made to replace the womb. If there are strong adhesions, fixing the womb in the abnormal attitude, these may be broken down surgically, but it will be a matter of expert opinion when this should or should not be done. If the decision is that the womb cannot be replaced, some relief may be obtained by supporting it with a pessary. In a recent displacement this may lead to a complete cure, the pessary being worn after a puerperal retroflexion for six months or longer. The pessary should be thoroughly cleaned in antiseptics every week or two. In some cases the womb soon retains its proper place, in others the pessary may have to be worn for years.

Tumours of the Womb.—Of the various tumours of the womb which occur, two varieties only do so with sufficient frequency as to render their notice necessary here, and these are, first, the so-called fibroid tumours of the womb, and, second, the cancers. The former are considerably more common than cancer, though the latter is far more serious than fibroids.

Fibroid Tumour of the Womb.—This growth makes its appearance in early life, and especially amongst the well-to-do classes. It is the common tumour associated with sterility, but rarely threatens the life of the patient. The tumour is made up of muscle of the non-striped variety along with some fibrous tissue, the proportions of these two tissues varying in different tumours. The tumour lies in a capsule which separates it from the womb tissue, though at one point the two may be connected. One section of the tumour looks like a cotton-ball, the muscle fibres being arranged in concentric layers. Frequently more than one tumour is present in the same case. The growth is somewhat slow; the more muscular the more rapid is the growth, the more fibrous the more slow is it. They increase in size more quickly during pregnancy, while after delivery they decrease and sometimes seem to disappear, as they also do after the change of life in many

cases. Occasionally these tumours grow to a very large size, and may even be mistaken for a pregnant womb.

Symptoms of Fibroid Tumours of the Womb.—The symptoms of these tumours—which some authorities regard as being so common as to be present in one woman in every ten or more—vary according to the particular part of the womb in which the tumour is growing, but broadly they are as follows: Irregular bleedings occur from the womb; menstruation is painful and profuse; sensations of weight in the abdomen are present; complaint is made of pressure on the bladder and lower part of the bowel; sterility is common; and if conception occurs abortion frequently follows. The bleeding first begins as an increase of the menstrual flow, not as a sudden hæmorrhage. The pain at the menstrual period resembles labour pains. The larger the tumour the more the “bearing-down” sensation. If the pregnancy in such a case happens to go to full time, it is obvious that the presence of the tumour may give rise to dangerous complications.

Treatment of Fibroids of the Womb.—These tumours are treated in various ways—medically, surgically, or electrically. The medicinal treatment is to give a non-stimulating diet with ergot or *Hydrastis Canadensis* internally. A course of mineral waters is also beneficial. Surgical treatment resolves itself into the removal of the growth by operation. Treatment by electricity relieves the symptoms, but does not cause the tumour to disappear. Galvanic electricity is used, one pole being applied on the abdomen, the other introduced into the cavity of the womb or into the mass of the tumour. The application is done every few days. It may be stated that those fibroids growing in the body of the womb without causing any distressing symptoms should be left alone; those under the mucous coat (polypoid) should be removed; and the rapidly growing ones always treated by operation, unless the patient is very near the change of life or menopause.

Cancer of the Womb.—This terrible and somewhat common disease of the womb attacks two parts of that organ, the neck and the body; but almost all the cases (98 per cent.) occur at the neck of the womb. From the neck it spreads upwards into the body of the womb, downwards to the vagina, and outwards to the surrounding connective tissue. It occurs later in life than fibroid tumours, and seems to occur more in the poorer classes. It may spread to the bladder wall, and finally to the rectum, or to both. It seems to be more common in this country than formerly, or else it is more commonly recognised. It does not occur before puberty, and rarely before twenty years of age, most cases being in women from forty-five to fifty-five, or from

the latter age to sixty-five. Many cases follow upon frequent child-bearing, though this is doubtless merely an assisting cause.

Symptoms of Cancer of the Womb.—There are three outstanding symptoms associated with cancer of the womb in women of the ages above mentioned. These are: first, *bleeding*; second, *an offensive discharge*; and third, the *onset of pain*. It is a gradual process, and the patient in the early stages shows no symptoms at all. As a rule, she comes to the doctor complaining that she has noticed some bleeding, and attributes this to menstruation having occurred once more. As cancer often comes on about the menopause, it often happens that patients do not seek advice at once, attributing it to the cause stated. This neglect of the growth in the early stage is a most serious misfortune, as the hope of successful operative treatment depends upon the stage of the growth. Then the patient notices the bad-smelling discharge which corresponds to the stage of the growth when the tissues are breaking down and ulcerating. The colour of this discharge depends upon the amount of blood in it, being from yellow to red. The absence of pain in the early stages is no doubt responsible for many cases of early neglect; indeed, there may be very little pain even when the disease is well advanced. But if it is severe the patient seeks advice on that account. It may be dull or acute, shooting down the thighs, and associated with other pains in the breasts. Later on the patient begins to lose flesh and becomes emaciated and weak. The weakness and pain give rise in time to a well-known cancerous appearance or “cachexia,” seen in this and other wasting diseases. Appetite is lost and digestion impaired, there is pain on passing water and on having a motion, these getting worse as the disease spreads, and involves the bladder and rectum. In advanced cases the odour of the disease sticks to the patient continually, and the skin has a dirty yellowish tinge. Finally, in the worst types, death follows in time from weakening of the whole system, continued loss of blood, absorption of toxic products from the ulcerating tumour, or peritonitis.

Treatment of Cancer of the Womb.—There is only one method of treatment for cancer open to the scientific physician or surgeon to-day, in spite of innumerable advertised “cures” by unscrupulous quacks who prey upon their unfortunate and credulous fellow-creatures. That one treatment is the removal of the entire growth by surgical operation, and nothing else holds out any hope of a cure. There are sad cases in which, from some reason or other, such as extreme weakness or old age, such an operation is out of the question, and where the treatment can only be directed to the relief of the pain and other distressing symptoms. Temporary relief may thus be gained, and the remainder of the patient’s life rendered less miserable

and more tolerable. Thus, strong caustics may be applied to the neck of the womb, the diseased tissue may be scraped out, the bleeding checked by the use of ergot with douches, the discharge kept as inoffensive as possible by douches of carbolic acid and other antiseptic disinfectants, and the pain relieved by morphia. Of all these the latter is the most important. The physician must recognise that his patient is doomed, and that his clear duty is to save her as much pain and suffering as possible. Some authorities go so far as to advise turning the patient into an unconscious opium-eater by gradually increasing the doses of morphia. In some cases the patient keeps wonderfully well and comfortable under this treatment, which, it must be understood, is only recommended in those hopeless cases when nothing but a painful lingering death can be anticipated. The all-important point in treatment is to suspect cancer in a woman who has ceased to menstruate and in whom bleeding once more appears, to seek advice at once, and undergo an early operation for the total removal of the malignant growth. Apart from this it is very important to attend to the general condition of the patient, especially regarding food, which should be plentiful, nutritious, and easily digested; to keep the bowels regular; and to take care that the patient is free from worry, and in a healthy mental and physical atmosphere. If digestion fails, milk, eggs, and beef-tea will have to take the place of more solid food. The room must be freely ventilated or the discharge will give it a most unpleasant odour. In any case it will be necessary in the latter stages to sprinkle some deodorants about to disguise the smell.

Various Forms of Fistula.—A fistula may be described as an abnormal canal or channel between a normal internal organ or passage and the exterior; or an abnormal passage between two internal channels. The ones which we have here to consider are the abnormal communications between the urinary, genital, and intestinal tracts. Of these various fistulæ four are figured in the accompanying illustration, namely, between the bladder and vagina (vesico-vaginal);

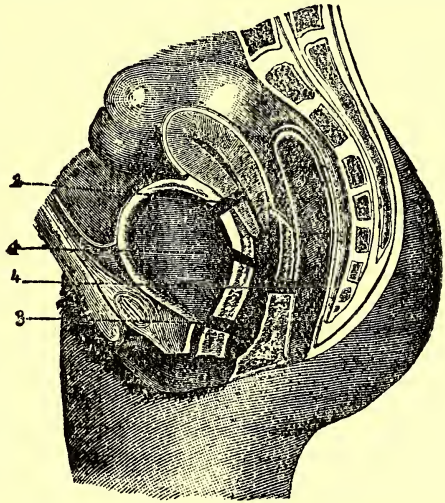


FIG. 14.—The various Forms of Fistulæ.
1, Vesico-vaginal; 2, Vesico-uterine; 3, Urethro-vaginal; 4, Recto-vaginal.

between the bladder and the womb (vesico-uterine); between the urethra and vagina (urethro-vaginal); and between the vagina and the lower bowel (recto-vaginal). Inspection of the above illustration will give a better idea of these ailments than any mere description in words.

Vesico-Vaginal Fistula.—This abnormal communication between the bladder and the vagina is the most common fistula in women, and the channel formed varies in diameter from a pin's head to a sixpence. It is caused by cancer, injuries in labour, or inflammations and ulcerations, especially after using pessaries which fit badly and are not kept clean. The most marked symptom is an involuntary flow of urine from the vagina, uncontrollable by the patient. The patient is conscious that the urine is passing in an unusual manner. The result of this incontinence is irritation of the vulva, and the inside of the thighs becomes reddish and inflamed. Menstruation is usually absent until the fistula is cured, when it returns. There may be sterility. Constipation is marked, and the general health considerably interfered with, which makes the patient the more anxious to allow an operation for the relief of the fistula. The operation consists in paring the edges of the fistula, so that healthy tissue may be brought in contact with healthy tissue by sutures, the patient being kept in bed and the bladder emptied by catheters. In cases of very large fistulæ which cannot be closed, the best thing to do is to close the lower end of the vagina, so that the upper part of the vagina is practically a part of the bladder. The menstrual flow then takes place through the urethra. Very small fistulæ may be closed by the cautery or by caustics, such as nitrate of silver. The other forms of fistula are too rare to require notice here.

Diseased Conditions of the Ovary.—We have considered the chief morbid conditions of the womb, and it is now advisable to add a few words connected with the other important female reproductive organs, namely, the ovaries. These are responsible for many conditions of importance in the ailments of women, some of them extremely serious. We may note the following: Absence of one or both ovaries congenitally; acute and chronic inflammation of the ovary; prolapse of the ovary; and ovarian cysts. Concerning the first of these, it is only necessary to state the fact that one or both ovaries may not be developed, or may be only partially developed; and, on the other hand, there may be extra ovaries termed supernumerary.

Inflammation of the Ovary.—Inflammation of this organ is often caused by septic conditions of the lower reproductive passages spreading up until the ovary is reached. Thus it may follow upon

an abortion, a premature labour, or a labour at full time. Instruments which have been used for any operation in the genital tract, and which have not been thoroughly clean and aseptic, may cause inflammation here. Occasionally it follows on a chill taken at the menstrual period, sometimes after an acute fever or peritonitis, and also after gonorrhœa. The symptoms of acute "ovaritis," as it is termed, are not specially definite, and are difficult to distinguish from those of any other inflammation in the same region, but there is a severe pain in the locality, and on physical examination the ovaries are extremely tender and somewhat enlarged. If the inflammation be long-standing or chronic the pain varies; sometimes it is dull, at other times it is sharp, but always worse after any hard physical strain or work, and especially worse just at the commencement of a menstrual period. There are also general symptoms. The patients lose their appetites, complain of sleeplessness and general depression, there is a feeling of being run down, and frequently some hysterical symptoms are also manifested. All these symptoms may in course of time pass off as the general health improves; but the inflammation may leave organic changes in the ovary in the shape of adhesions to structures near, or, if septic, abscesses may form and burst either into the bladder or the abdominal cavity.

Treatment of Inflammation of the Ovary.—When the case is acute a blister may be applied over the affected ovary, if only one be inflamed, or over both in cases of double ovaritis. A hot vaginal antiseptic douche gives some relief. The bowels must be kept freely open, and the patient given complete rest from work or active movement. The peritonitis, if present, must be treated as such. In chronic cases the blisters and hot douches may still be administered, and in addition hip baths, with iodide of potassium internally. All sexual connection must be avoided. Should general treatment fail, as it does in some severe cases, an operation for the removal of the ovary is advocated. Sterility, of course, follows if both ovaries be removed, but it frequently also follows upon the inflammation itself.

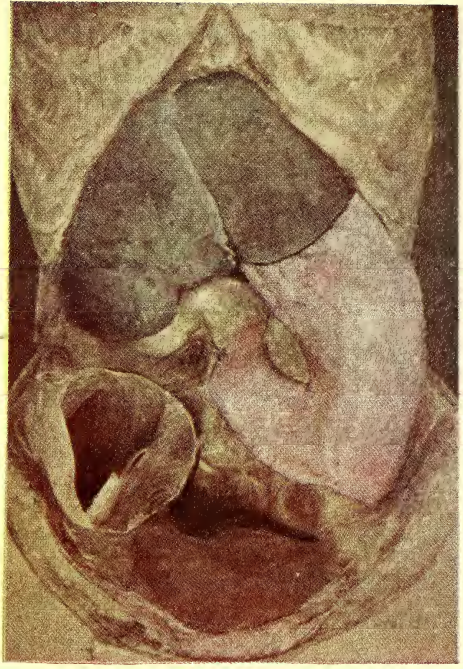
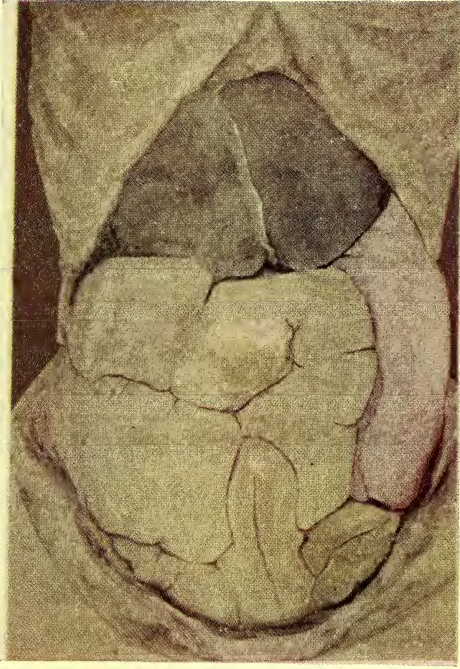
Prolapse of the Ovary.—Most cases of this kind occur during the weeks following labour, because during the pregnancy the ovaries are enlarged and the ligamentous supports have become softened and somewhat stretched. The conditions referred to previously as retroversion and retroflexion of the womb also drag the ovary down and cause prolapse, and it is said that a sudden jump or jolt may have a similar effect. Inflammatory adhesions which contract as they get older are another source of the displacement. The symptoms are the presence of pain in the pelvis, which is worse on coitus or defæcation, a feeling of dragging and soreness, and some nervous symptoms. The

treatment is to apply blisters to the pelvic region, hot douches, and to keep the bowels open and regular. The question of the removal of the ovary in severe cases following inflammation may have to be considered.

Ovarian Tumours and Cysts.—A number of cystic conditions are met with in the ovary, some of them being due to errors in development. Various parts of the organ are involved in different kinds of cysts, the Fallopian tube and the ovarian ligament being involved. Of the small cysts one form is due to the distension of the ovarian follicles, which run together, and give rise to the presence of a number of little cavities containing fluid. The ordinary ovarian cyst is termed "multilocular," because it is composed of several compartments, the smaller within a larger. Some of these reach a large size. The so-called Dermoid cysts arise from errors of development, and are very curious in structure. They always contain some of the structures usually found in the skin, such as hair, sweat glands, or sebaceous glands. In addition to skin elements, teeth, bones, nerves, and muscle may occur, the cyst evidently being an improperly developed foetus, or, at any rate, the result of a germ cell. These are the most common ovarian tumours which are found before the age of puberty. But besides these, there are malignant tumours which become cystic; that is, in which a cavity forms which contains fluid or semi-fluid contents, and, finally, solid tumours are found here as in other organs. There are sometimes cancers, at other times sarcomas.

Symptoms of Ovarian Tumours.—Most tumours in this region grow slowly and insidiously, reaching a considerable size before giving rise to any severe symptoms—frequently they are discovered only when examination for some other purpose is made. At other times symptoms may occur early in connection with bladder irritation, difficulty in passing the motions, or pain at such times. There may or may not be pain in the abdomen, sometimes it is complained of in the back. As a rule, menstruation is not profoundly interfered with. It is astonishing to what a great size these tumours may grow before real illness is felt, but sooner or later the mere physical bulk of the tumour makes itself felt. Digestion is impaired, dyspepsia follows, and as a result there is weakness and loss of general strength and health. Then if the tumour comes to press upon the veins, dropsy is caused in the legs or abdomen, and peritonitis may be added. The dull dragging pains when present are caused by the pressure and traction of the actual growth, which eventually interferes with the action of the stomach and the lungs. Menstruation may be affected in two opposite ways, the flow being increased in some cases,

DEFORMITIES.



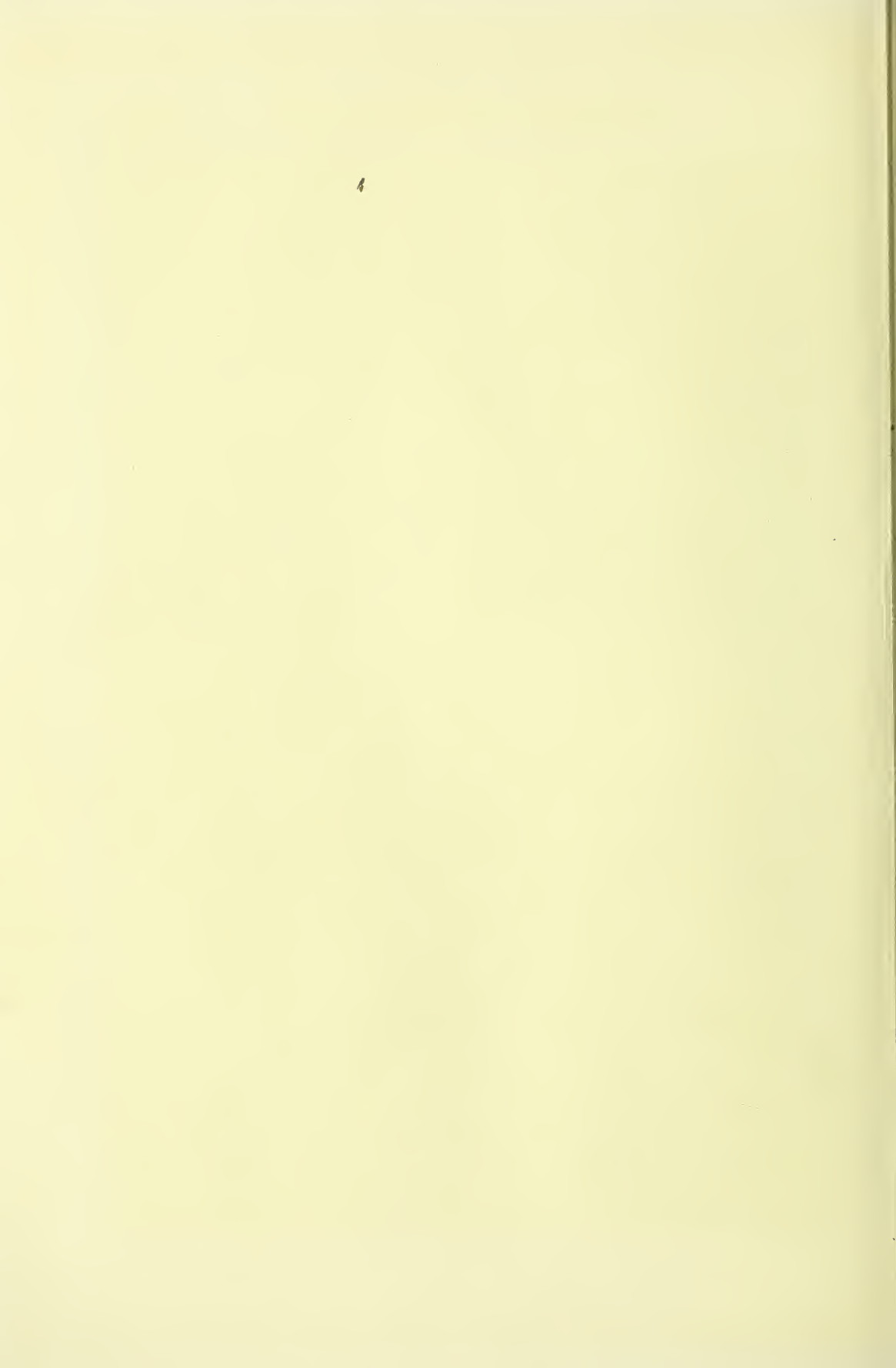
Displacement of LIVER, STOMACH, INTESTINES, and other VISCERA—a common result of tight lacing. In the first Drawing the enormously distended and displaced COLON is seen, with the displaced LIVER above, and the STOMACH along the Left Side. In the second Drawing the INTESTINES have been removed. The lower part of the LARGE INTESTINE was found to be obstructed, and the PELVIC ORGANS intensely congested.



Malformation of Spine, Ribs, and Pelvic Bones,
due to RICKETS.



Malformation of the PELVIS, due to Softening of
the Bone (*Osteo-malacia*).



suppressed in others. Sterility may result, but pregnancy occurs in some cases, and then the presence of a tumour in the ovary may become a very serious complication. The health of the patient usually remains good for a considerable time while the tumour is growing, until, in fact, the size of the growth itself acts directly by pressure on the other organs of the body. The possibility of an ovarian tumour being mistaken for a pregnant womb must be borne in mind, as gross and unjustifiable suspicion may otherwise fall upon an innocent patient. The treatment of these conditions falls to the surgeon, and involves a serious operation.

Inflammation of the Vagina.—This condition may be caused by gonorrhœa, by irritating discharges from the womb, by alterations in the urine, and by the injection of too hot douches. It may also result from the wearing of pessaries which do not fit the patient, and so cause irritation. The symptoms are a sensation of burning pain in the vagina, accompanied by a desire to pass water very frequently, and scalding pain in the urethra when the water is passed, along with a somewhat profuse whitish discharge from the vagina itself. All of these symptoms are more profound in gonorrhœal cases. In the most acute stage the treatment is complete rest in bed with free evacuation of the bowels, a warm antiseptic douche, with suppositories of morphia if the pain be very severe. In chronic or old-standing cases astringent douches of alum may be given, or a solution of chloride of zinc, 2 grains to the ounce of water, may be applied.

Occlusion of the Vagina.—A complete closure or occlusion of the vagina may occur at the hymen or in any part of the length of the vaginal canal. It is technically termed Atresia of the vagina. This occurs either as a congenital deformity or as an acquired condition. The former cases are caused by the non-development of some portion of the vagina, or to subsequent closure during development. The latter, or acquired closures, result from various inflammations or injuries which cause fibrous contractions to take place, thus occluding the lumen. Perhaps the commonest form of acquired occlusion is that which results from sloughing of a portion of the vaginal wall after labour, this taking place in the upper part of the canal, and involving the neck of the womb as well. From whatever cause the occlusion arises, it follows that the blood-flow at the menstrual period is unable to escape, so that in a girl commencing to menstruate the blood accumulates above the site of the closure. As time goes on this causes necessarily a dilatation of the vagina, and possibly also of the womb, and even the Fallopian tubes as well. This distension may be very pronounced, and be indicated by pelvic swelling. The condition will therefore not be noticed until the time

of puberty, when pain is felt at the menstrual periods, but there is no appearance of the blood discharge. This pain becomes worse, and lasts longer at each period, until ultimately it is continuous from one period to the next. The distended organs will cause the action of the bowels and the bladder to be interfered with and painful. The treatment of occlusion of the vagina is to pierce the obstruction of the hymen (if that be the seat of it) with a trocar, and allow the accumulated fluid to drain slowly away. When all has escaped the incision is enlarged, and the vagina washed out with an antiseptic, the patient remaining in bed for some days. In obstruction higher up the vagina the obstruction must be cut through, drained as before, and the cavity above frequently washed out, until the new artificially made canal becomes permanent.

Affections of the Vulva.—Two conditions of the vulva call for notice here—namely, inflammation, and itchiness or pruritus. Inflammation here, as elsewhere, is either acute or chronic, affecting the outer surface of the vulva, or the surfaces which come into close contact with each other. In the first case, the inflammation is found to affect mainly the roots of the hairs. In the latter form the surfaces are very reddened, swollen, and extremely tender. The condition usually follows upon an inflammation of the vagina itself, or occurs as the result of irritating discharges coming from some part of the genital passages—for example, in cancer of the womb. Dirty habits are responsible for some cases. Others tend to arise in fat women if they take violent exercise in hot weather, while masturbation is a cause of other cases. In weakly children who are not carefully looked after, the dribbling away of urine also starts inflammation of the vulva. The treatment is to douche the parts with warm water, to which may be added some lead and opium lotion if pain is excessive. The vulva may be powdered with iodoform night and morning, and should any small abscesses form they must be opened.

Pruritus Vulvæ.—This condition, which is occasionally a very troublesome one, is characterised by great itching of the vulvæ, in the majority of cases worst in the region of the labia minora. It is caused by a variety of other conditions, the most important being the following: Drying of the urine in a patient suffering from diabetes; inflammations of the vulvæ; irritating discharges from the womb, vagina, or bladder; parasites in the vagina (worms); and from various diseases of the vagina and womb. The treatment therefore depends upon the precise cause in the particular case, and is directed to its removal. The parts must be kept scrupulously clean. Soothing ointments should be applied after cleansing. Some cases which refuse to yield to local treatment seem to be caused by a diseased condition

of the nerve-endings in the vulva, and such cases are incurable except by operation.

Tumours of the Breast.—The mammary gland is one of the commonest situations in the female for the occurrence of tumour growths, some of which are innocent or benign, others being extremely malignant. The innocent tumours are fibrous growths, warty or papillomatous growths, cysts, or gland tumours (*adenomal*). The malignant tumours are sarcomas and cancers. The last of these constitutes one of the gravest conditions to which women are liable, and unless recognised early in its development and thoroughly removed by surgical operation, causes death by spreading to other situations sooner or later.

Symptoms of Tumours in the Breast.—Some of the innocent tumours are quite small nodules which the patient only discovers accidentally, perhaps as she is washing herself. They are most common before the age of twenty-five and after puberty. Others, which partake of the nature of an overgrowth of the whole gland structure, may attain a very large size, necessitating removal. Of the malignant ones, the sarcoma is somewhat rare, and we may limit our attention to the cancers. In these tumours one part only of the gland is usually affected first, the growth then spreading throughout the breast. The skin over the tumour becomes infiltrated, then the tissue behind the breast, and finally the muscles, the whole process occupying about two years in reaching this stage. The lymphatic glands in the armpit become affected after the first year of the disease. The large soft cancerous growths run the most rapid course, the harder varieties taking longer. Some forms last quite a number of years, whilst the most malignant may bring the patient to the verge of death in little more than one year. From the original site in the breast, secondary growths occur in the liver, lungs, bones, or brain, in about two years. The only treatment is early and complete removal of the whole breast, together with such glands as are already affected. The sooner the operation is performed the more chance is there for the patient to secure some years of life. Even when the tumour recurs the growth should be removed again and again, life being prolonged much by these means, and some cases entirely cured. The average duration of life in cases where the glands of the armpit are not affected has been placed by some authorities at fifty months, while in those cases in which the glands are already involved the average length of life is put at twenty-nine months. By far the greater number of cases of cancer of the breast occur about the end of menstrual life, an age which seems in some way to specially predispose women to this disease. It is also more common in women who have

had a previous inflammation of the breast than in those who have not, but it has not been shown that the cancer appears in that portion of the breast which was the special seat of the inflammation. As a matter of fact, while there seem to be a number of conditions which render women more susceptible to cancer, no one of them has an undisputed connection with this terrible disease, the cause of which has so far eluded absolute proof or demonstration. Heredity plays a part apparently, some eight per cent. of all cases showing a family history of cancer. The symptoms are fairly definite. "When an induration or nodule appears in the breast of a woman who has passed the thirty-fifth year, and the new growth cannot be isolated from the surrounding tissues, and continues to grow, becomes harder, and is more or less painful, there can be no question that it is a cancer. If the axillary glands enlarge, the prognosis is even more unfavourable, as it also is when the tumour rapidly softens, or when the skin in its vicinity shows hard, reddish nodules. The prognosis is very unfavourable when the disease rapidly extends from one breast to the other."

Treatment of Cancer of the Breast.—Once more we emphasise the statement that in the present state of our knowledge the one and only hope of relief is the surgeon's knife, and that in the earliest possible stages. All the advertised secret remedies are so many snares to catch sufferers who fear the resort to surgery, but all are equally futile. At the present moment science recognises no method of checking a cancerous growth which has once started, though many brilliant brains are at work in the hope of discovering some safe treatment for this scourge of humanity. The use of adhesive plasters, or any preparations which irritate the skin of the breast over the site of the tumour, should be avoided. When for some reason removal of the tumour is impossible or hopeless, all that can be done is to relieve pain by palliative measures, but no drugs have really much effect upon the actual growth.

SECTION IX

THE CARE OF INFANTS

Of late years mothers have taken a much more intelligent interest in the development of babies, and have watched not only the physical but the mental growth of their children with a certain amount of trained observation. And, indeed, it is essential that a mother should be able to recognise whether she is dealing with a normal or abnormal

infant. A record book of the child's progress is useful and helpful, and there the weight, growth, &c., of the child can be noted for future reference. The average weight of a child is as follows :—

Weight at birth	lbs.	Weight at seven months	lbs.
one month	6.8	eight	13.4
two months	7.4	nine	14.4
three	8.4	ten	15.8
four	9.6	eleven	16.8
five	10.8	twelve	17.8
six	11.8	thirteen	18.8
	12.4	fourteen	19.8
		fifteen	20.8
		sixteen	21.8
		seventeen	22.8
		eighteen	23.8

For the first six months the baby should be weighed once a week—directly after its bath ; after six months it can be weighed monthly. A big baby at birth will often scale between 7 and 8 lbs., whereas a premature or tiny child will often scale as low as 4 or 5 lbs. The important thing for the mother to notice is whether the child slowly but steadily increases in weight.

The average height of a child at birth is 20 inches ; at six months, 27 inches ; at twelve months, 31 inches ; at eighteen months, 33 inches. The circumference of the head is important to notice, because here great size is not always a good sign. At birth the average is 13 inches, at six months old it is 17 inches, and at twelve months old, 18 inches.

A baby ought to begin to hold up its head between the third and fourth month ; it is one of the best signs of progress when an infant of this age ceases to let its head lollop about and can hold it steady, or even raise it from the pillow. Of course some babies are more backward than others ; but if a child does not hold up its head by the fifth month, a doctor should be consulted. A child begins to sit up at ten months, and to walk at twelve months ; it begins to talk at eighteen months as a rule, but never hurry a child into walking or talking till it is ready. On the top of a baby's head is to be felt the open space called the "fontanelle," where the bones of the cranium have not yet joined. This ought to close between the eighteenth and the twenty-fourth month.

Tooth Development.—The coming of the teeth is a milestone in the child's progress that the mother is glad to see safely passed. The first teeth should make their appearance about the sixth month ; the two lower incisors appear first, and in the seventh month the two upper incisors should show. The upper lateral incisors appear in the ninth month, the lower in the tenth month ; and at twelve months the four back teeth or molars. The canines appear about the eighteenth month, the second molars in the second year, and by the time the child is three years old the first dentition should be complete. Most

babies cut their teeth without difficulty; but sometimes the gums become swollen and inflamed, and the child naturally fretful. There may be dribbling, and care must be taken that the child doesn't wear a wet bib and get cold. Very often it soothes the child if the mother rubs the gums gently with her little finger; an indiarubber ring to bite on also helps the child, but be sure the ring is kept clean. If the child gets very restless and screams at nights, a warm bath (about 104°) will often quieten it—just a quick plunge into and sponge over with warm water—the head and face *not* being washed. Then put to bed, and probably sleep will come. The teeth must be cleaned when the mouth is washed out, but a tooth-brush should not be used till the child is two years old, and then only a very small soft one.

Backwardness in the oncoming of the teeth and in walking may be a sign of rickets; and rickets is a disease that can be cured by fresh air and good food. Therefore don't worry if your baby does not exactly come up to date in all its progress, but if it is markedly backward it is always better to consult a doctor and get his advice. Often the brightest and strongest children are late in walking and talking; but the signs of general intelligence are plain enough to the observant mother. When a child first "takes notice" of a light, or smiles at one it knows, are symptoms as important as those we have quoted, but less possible to date exactly. The main point to remember is that any defects in a child's general health are more easily remedied if attended to early; and since the infant cannot speak, it is the mother's duty to observe, and so detect the evil.

Feeding of Infants.—One of the most important points in the rearing of infants is proper feeding; and one of the greatest trials to a young mother is when she is unable to suckle her child herself. For nature's method of feeding the baby saves a vast amount of trouble, and the woman who can, but won't, nurse her child, is not only wicked but foolish. It has come to be believed that nursing spoils the figure, but this is not so; the figure is much more likely to resume normal proportions when the breasts have been put to their proper use. That nursing is a tie on the mother must, of course, be admitted, for a child should be fed with clock-like regularity. But the woman who thoughtlessly decides on bottle-feeding in order to be more free to gad about, often enters on a period of worry and anxiety far worse than aught she could have met with through suckling. For only an experienced nurse knows how difficult a thing it is to supply an artificial milk to suit the needs of a little child. Again and again some different modification has to be tried; and most assuredly, even if the child prospers, it is never to the same extent the mother's own child if it has not fed

at her breast. We absorb character as well as food with our mother's milk. Also suckling has some effect in preventing too rapid child-bearing, which is a terrible drain on a woman's health, and a far greater tie than breast-feeding. So far at least as for the first six months a mother should feed her child, if she is in good health, and if the child thrives on the mother's milk. There is a superstition that the nursing mother should drink stout and eat enough for two people, because she is feeding the baby. This often leads to the mother getting indigestion and other evils to such an extent that the child suffers too. The nursing mother should avoid stout and all stimulants unless ordered them by medical advice. She should drink plenty of milk, and otherwise feed on her ordinary diet, avoiding pastry, tea, or anything likely to cause indigestion. She must also avoid all excessive excitement, the bad air of theatres or crowded trains, and all worry and uncharitableness. A mother who is self-controlled and good-tempered means a healthy and happy baby.

There is one danger about breast-feeding, and that is that the mother should suckle the child whenever it cries, or at any odd times. Now, a little crying twice a day or so does not necessarily mean that a child is ill or hungry; a whining or shrieking baby means something wrong, but it is generally held that a little crying is merely healthy, and you will note that the child never produces any tears till it is over three months old. Rather let the child cry a little than constantly feed it at odd times. But if together with the crying it is cold and looks ill and the face twitches, give a little dill water and wrap it up warmly, and let it lie face downward on your knee for a bit. It probably has "wind," and if so this will cure it. A baby under two months old should be fed every two hours by day and every four hours by night; by day it should be roused regularly at meal times and put to the breast; at night it should be allowed to sleep as long as it will. From two months to nine months the child should be fed every three hours by day and only once by night. If you rouse a baby of this age at 10 P.M., and feed it before you go to bed, the child will often sleep till the early morning and give the mother six or seven hours unbroken rest. Over nine months of age a child should be fed every four hours by day and not at all by night; but the day feeding should be arranged so as to give the first meal about 6 A.M. and the last about 10 P.M.

But though mother's milk is the best form of food for a child, there are too many cases in which, through accident or illness, nature's method cannot be adopted. Then comes the question of the best substitute; in continental countries the wet nurse is still a great institution, but there are grave dangers to this course, and it is

seldom adopted in Great Britain, nor do we recommend it except in very occasional cases. Then the utmost care must be taken to secure a young, clean, healthy woman, and, if possible, one of even temper and kindly disposition. If the mother cannot nurse the child, it is best to feed it on properly prepared cow's milk given from a bottle.

Cow's Milk and Human Milk.—A large number of experiments have been made with a view to the best method of approximating cow's milk to human milk. Cow's milk is slightly acid and stronger in albuminoid than is mother's milk; it also has less sugar and fat. Therefore the most simple form of diluting it is to add lime water to counteract the acidity, to add plain water or barley water to reduce the strength, and to add sugar and cream to increase the saccharine and fats. Suppose our infant is still only one week old: it will require to be fed every two hours by day and every four or five hours by night, and it will require $1\frac{1}{2}$ fluid ounces to each meal. A fluid ounce is about two tablespoonfuls. Each meal must be freshly prepared. Take one tablespoonful of fresh cow's milk, and mix with one tablespoonful of barley water and one of lime water. Add a teaspoonful of cream and a saltspoonful of finest white sugar, or better far, a pinch of milk-sugar, which can be got at any chemist's. Note that this amount exceeds the total needed for one meal, but it is not well to let the baby suck to the very last drop in case it draws in air, and therefore an excess should be put into each bottle. This mixture should be heated to 99° F. and then poured into a warmed bottle. The exact warmth at which the food should be given is 98.4° F., but it is sure to cool slightly in being put into the bottle and whilst being taken. As the baby gets older the amount of milk needs increasing, and also the amount of each meal. The table on infant feeding circulated by the Battersea Borough Council is as follows, and is excellent in every way:—

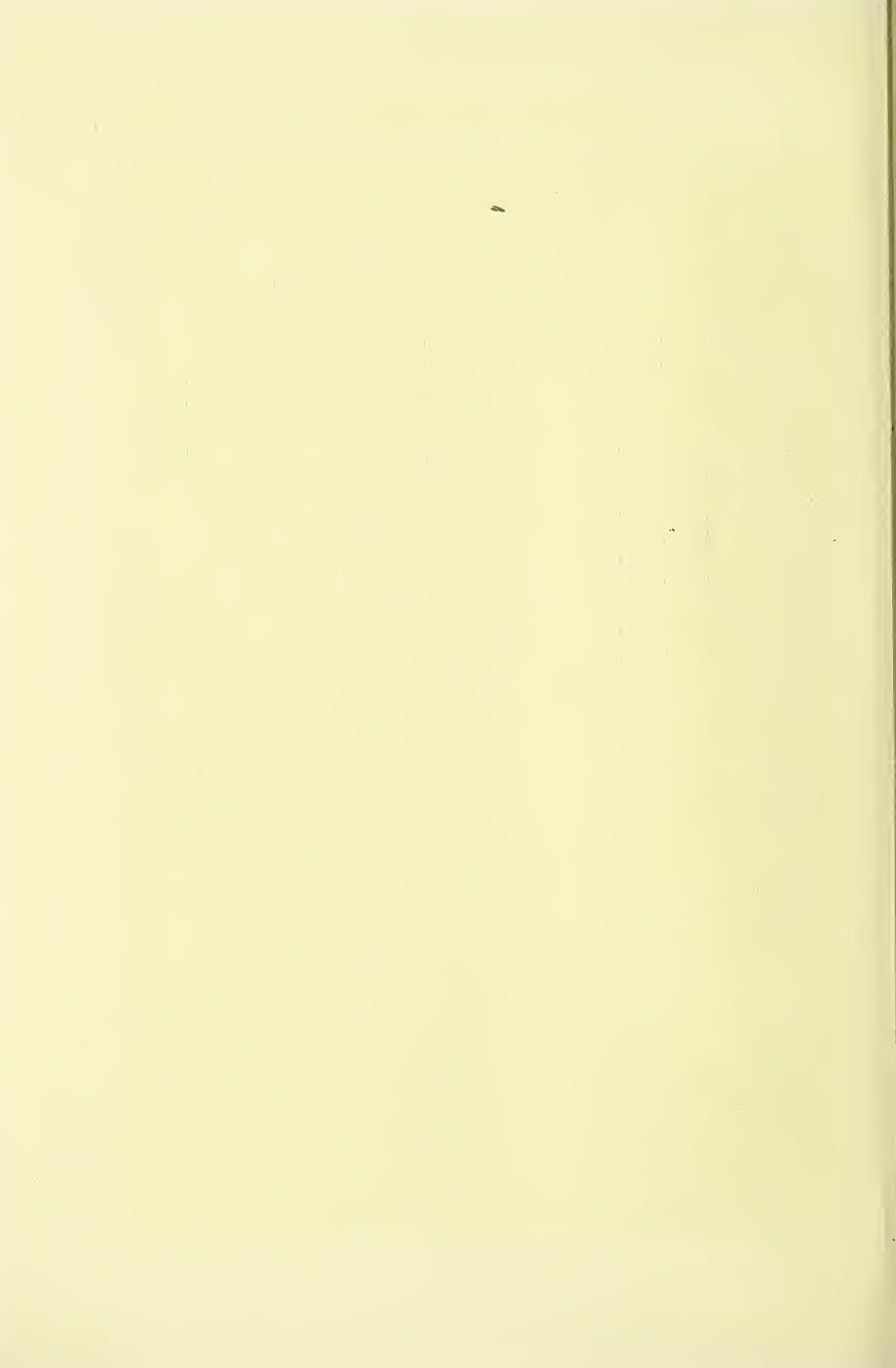
Age of Child.	Modifications.	No. of Bottles per Day.	Amount per Bottle.
During first fortnight	Milk 1 part, water 2 parts	9	$1\frac{1}{2}$ oz.
" second "	" "	9	$2\frac{1}{4}$ oz.
" second month	" "	9	$2\frac{3}{8}$ oz.
" third "	Milk 1 part, water 1 part	9	3 oz.
" fourth "	" "	8	4 oz.
" fifth "	Milk 2 parts, water 1 part	7	5 oz.
" sixth "	" "	7	5 oz.
" seventh "	Milk practically unmodified	6	6 oz.
" eighth "	" "	6	6 oz.
Over eight months	" "	6	7 oz.

The cream and sugar can be slightly increased in proportion with the amount of milk; and instead of plain water, either lime water or barley water can be used.

COMPARATIVE ANALYSIS OF HUMAN, COWS', AND ASSES' MILK.

	Analysis of Mothers' Milk.
Proteids - 2%	<div></div>
Fat - 3.4%	<div></div>
Sugar - 6.7%	<div></div>
Water - 90%	<div></div>
	Analysis of Normal Cows' Milk.
Proteids - 4%	<div></div>
Fat - 3.9%	<div></div>
Sugar - 4.3%	<div></div>
Water - 85%	<div></div>
	Analysis of Normal Asses' Milk.
Proteids - 2%	<div></div>
Fat - 1.3%	<div></div>
Sugar - 6.3%	<div></div>
Water - 90%	<div></div>

NOTE.—Taking Mothers' Milk as the perfect food for an infant, note that Cows' Milk is deficient in water and sugar, and carries an excess of proteids, while Asses' Milk is practically, in comparison, deficient in fat only.



Care of the Milk.—This all sounds very simple and very nice, but alas! experience too often proves that with our best and most scientific efforts to emulate mother's milk, the baby does not thrive. Sometimes this is the result of not properly preserving the milk, or of not keeping the bottles and teats clean. It is very important to get the best milk you can for your baby, and if you are in the country you can generally get some knowledge of the farm from which the milk comes, and ascertain that the cans and so on are properly scalded and cleaned. If you are in a town it is advisable to go to the very best dairy, and make inquiries where they get their milk from, and if the farm is subject to veterinary inspection. If you are satisfied that the milk as delivered to you is pure and clean, then ascertain how it is kept in your own house. It should be received twice a day in a sealed can, and should be immediately emptied into a clean jug that has been properly scalded out with boiling water. Put the jug in a cool place (not near meat), standing it in a basin of cold water if the weather is warm. Cover the top of the jug with a saucer to keep out flies, &c. If you are in the least doubtful about the source of your milk supply, or if the milk shows a disposition to "turn," it should be boiled directly it is received into the house. Particularly is this necessary if you hear of any cases of fever in the neighbourhood. Unfortunately boiled milk is apt to cause constipation in infants, and also it is less palatable, and infants often refuse it. It is possible, however, with a proper apparatus, to sterilise the milk by heating it up to 160° F. (boiling point is 212° F.), and keeping it at that temperature for ten minutes. This kills all germs and keeps the milk from going sour, and yet does not make it so indigestible or nasty to the taste as boiling does. Directions for use are always sold with the milk steriliser or pasteuriser (which is merely a double saucepan), and the cost is only a few shillings. The milk must be cooled down gradually. Nearly all large dairies in towns now supply sterilised milk ready modified for the use of infants, and thus mothers are saved much trouble with hand-fed babies; but it must be remembered that the *fresh* cow's milk is better for the child than sterilised milk, if you can be certain that the fresh milk is pure. Never remove the cotton-wool stoppers, or covers, from your sterilised-milk container, until you are going to use the milk, or fresh germs may get in.

Other Milks.—If in spite of all efforts the milk still does not suit the child, it is well to try either ass's milk or goat's milk. Ass's milk has often proved very digestible to delicate babies; it is weaker than cow's milk, and needs no diluting, but it needs the addition of cream. It is not a suitable diet for more than a week or two, but has been found efficacious in tiding feeble infants over a crisis. Goat's

milk, on the other hand, is very strong, and needs diluting in the same proportion as cow's milk, but no cream should be added. It is sometimes the cheapest method of being sure of the source of your milk supply, to buy a goat; especially is this the case for English people living abroad. You can see that the animal is cleanly fed and housed, and that the teats are washed before the milking is begun, and that the milk-maid, or man, has clean hands, and receives the milk in clean vessels. Another method of modifying milk is to pre-digest it by means of Peptogenic Milk Powders, directions for the use of which are sold with the powders. This method should never be tried save under doctor's orders; also all patent foods and condensed milks should be avoided save under medical advice. If the delay in the child's progress is not due to the milk, it may be due to the bottles or the method of feeding. There should be at least two bottles and two teats in use, and the boat form of bottle, which has no long tube, no corners, and is open at each end so that a stream of water can be sent right through it in washing, is the best. A graduated bottle also saves trouble, though a measure glass for securing right quantities before mixing is also necessary. After each using, the bottle must be scalded out with boiling water and then put to soak in cold water. Any milk left over by the baby must not be put back or used again—but it can be given to elder children if desired. The teat of the bottle should be of best indiarubber, and should be well washed after each feeding in warm water. The teat should be turned inside out and the inside well washed; then leave soaking in cold water, to which a pinch of bicarbonate of soda has been added.

Position in Feeding.—The child should be in a reclining position when fed, and held quietly and firmly. Don't sit the child up in the middle of its meal and thump its back. Hold the child on your left arm, and with the right hand hold the bottle to the mouth; guard the child against taking the food too quickly. There should only be two small holes in the teat of a baby under two months, afterwards there may be more holes; but the holes enlarge with use, and as teats only cost a few pence, it is foolish not to get new ones when necessary. An infant should take from five to ten minutes over each meal; if it sucks too vigorously, withdraw the teat now and again; if it sucks feebly, rouse it by a touch on the cheek, see that the holes are large enough, and encourage it, and try patiently to get it to take the full amount. When the meal is finished, put the child down and let it sleep; don't dandle it or play with it just after a meal. As a rule a child should be roused to be fed by day, but not by night; if you feed a child very punctually it soon gets to know feeding hours, and does not worry for something to suck at in between. Of

course a well brought up baby never uses a "comforter" or sucks its thumb; the latter habit causes the front teeth to grow out in the ugly manner that the French believe typical of English women, and the comforter causes the still uglier mouth of which the lips do not meet. And apart from a question of looks, it is bad for the child's health to be always sucking at a teat, and to be constantly having a teat, which has fallen perhaps on the ground, picked up and shoved—all dirty and dusty—into its mouth. It allows the digestive system no rest, and often causes wind and bad temper. A healthy child should be kept on a milk diet as long as possible. And if a child is thriving on the food you give it, don't be in a hurry to change. For instance, when your baby reaches the seventh month, there is no need to give it undiluted milk to the day, if the diluted milk seems to satisfy it and the weight is steadily increasing. Use the table on page 160 as a guide only.

But there are some children for whom the doctors prescribe raw-meat juice at a very early age, and other doctors recommend a cup of beef-tea once a day for children from nine months old. Again, a teaspoonful of malted wheaten food is sometimes ordered for the midday bottle of a child only four or five months old. But unless for some good reason, or under medical advice, keep your child entirely on milk up to its first birthday. Should raw-meat juice be ordered, get $\frac{1}{4}$ lb. of lean beef-steak, chop it up and put it in a cup with just enough cold water to cover it. Stand it in a cool place, and keep it covered, for an hour; then put it in a muslin bag and strain off with pressure. It must be made fresh for each occasion. As a rule it is best given neat with a teaspoon, but it can be given mixed in the bottle with milk. Babies usually dislike it, and if it is given with the milk it may turn them against their natural food. The addition of a little sugar makes the juice more palatable for some children. Beef-tea or mutton broth for babies must be made free from fat and according to the recipes for invalid cookery.

If a patent food is ordered, choose a well-known one, such as Savory & Moore's. Give half the amount ordered with the midday bottle, the other half with the last bottle given at night—which should be about 10 P.M. If a child is roused at 10 P.M. and given a good meal, it will often sleep all night through—to the great advantage of its parents.

Weaning.—It is best to begin to wean a breast-fed baby at about nine months.

Never wean a child during July, August, and September. This hot season is always trying to infants, and if the change of food sets up diarrhoea it is dangerous to the child. Some mothers find it expedient to give the child an occasional bottle from as early as the

fourth or sixth month. If the mother is not very strong this may be to the advantage of both parent and child, and the superstition that cow's milk will not agree with a breast-fed baby belongs to cases where the proper modification of the cow's milk has not been carried out.

At first the midday meal should be given from the bottle, then gradually all the day meals, so that by twelve months old the child is weaned altogether. It often needs a little patience to teach a suckled child to feed from a bottle, and some mothers prefer to wean by means of a spoon, and then a cup, and never to use the bottle at all. By nine months a child can easily be fed by a spoon, but it is a longer and more tiresome process than feeding with a bottle. A strong, hungry child of twelve months old needs a rusk, or some stale bread crumbs, well broken up and mixed in its midday milk; and at eighteen months a little custard or other light milk pudding may be added. The tendency in England is to give children meat and tea and other stimulating stuffs much too young. Mothers are very difficult to satisfy; if their child is fat they get anxious and want it made thin, if it is thin they get still more anxious and want it made fat. But it is natural for some people to be thin and for others to be fat—just as it is natural for some to be fair and others dark. Fat children are often unhealthy, and only made fat for the time by being fed on patent foods, and if fat from this cause they often develop sores and curved bones. If your child eats well, sleeps well, and grows steadily, never mind if it is not quite so forward as other children. Indeed stout children should be kept backward as regards walking, as their legs are not strong enough to support heavy bodies at an early age.

Clothing.—Ready-made layettes are often extravagant and unsatisfactory. A mother will find it better to make the baby-clothes herself. Nor need this take very long, for the child's garments should be as simple as possible, though there should be an ample supply.

Theories and fashions change with regard to infants' dress as well as to adults; and it is a good thing that short-sleeved, low-necked gowns are now but seldom seen on babies. Be it remembered that the normal temperature of a baby is several degrees below that of an adult, and it will be seen how necessary it is to keep up the heat of the little body by covering it well with warm, light clothing.

The modern theory is in favour of all-wool clothing, and only three garments for the child; but there are some babies certainly to whose skin this system is too irritating, and the mother who is preparing beforehand had better include a few lawn shirts. It is, of

course, best for each mother to form her own theory of clothing, and to carry it out, but for the inexperienced the following list may be some sort of guide:—

Three Woollen Vests.—These should be of fine soft material, and woven—not hand-knit; with long sleeves and opening down the back.

Three Binders.—These should be 5 inches wide and a yard long, of the very finest, softest flannel, or cashmere, or woven wool.

Four Shirts.—These can be of linen or nainsook, or fine long-cloth; 26 inches long and 6 inches deep is an average size, leaving plenty to lap over at the back and to turn down at top, back and front. There should be no armholes, but straps from the front to sew over on the back. In winter, if the baby stands the woollen vest next the skin, these are not needed. Or woven shirts such as Jaeger provides can be used, and these being all wool act as vest and shirt in one. There is a good pattern with woollen pilch that buttons on, but the cost at Jaeger's is 6s. 9d. each.

Four Long Flannels.—These should be $1\frac{1}{4}$ yards wide and $\frac{3}{4}$ yard deep. In summer cashmere can be substituted for flannel. If these are to be worn day and night six should be provided. Again, there should be no armholes, but the arm-strap may be made to button or tie down in front if preferred.

Four Night Dresses.—Of nainsook or long-cloth for summer, or cashmere or flannel for winter. These can be made dainty and pretty without being made too elaborate. They must have long sleeves, and be high at the neck, and fasten behind with strings. Be sure the armholes and wrist-openings are large enough, and that the garment is long enough to well cover the feet—say 28 inches long.

Four Robes.—Not the usual over-trimmed, open-worked, lengthy garment, if your love for your child is greater than your pride. If you believe in the “all-wool” theory the robes can be of nuns-veiling or llama; or, if you mildly disbelieve in muslin, they can be of washing silk, and be warm and light, and also pretty. The old-fashioned gorgeous family garment, that hung down almost to the ground, is now quite discarded, so are the short sleeves tied up with ribbon, and the low neck. Nothing is more dainty than a little silk robe, smocked at neck and wrists, so that it fits any-sized baby, and with a little Liberty silk sash.

One Dozen Towels.—Soft Turkish towels are the most easily washed and the least irritating wear. It is sometimes convenient to have more than a dozen, but it is not well to provide overmuch beforehand, and they can always be bought. Flannel towels are too heating; if the Turkish are thought too bulky, cotton ones can be used.

Three Flannel Pilches.—These should be 26 inches square, and if not made to button to the bodice, should have strings and loops.

Two Head Flannels.—One should be the ordinary yard square head flannel without a hood, and can be prettily embroidered. The second head flannel, for carrying baby from one room to another, should be larger, or a soft Shetland shawl can be used instead.

These are all the garments that are absolutely necessary; caps, cotton binders, and waterproof pilches are no longer considered healthy, and should not be used. But there are several garments which will not be wanted whilst baby is very young, but which the mother may think best to provide beforehand. These include six bibs, three pairs of woollen boots, one hood, one cloak, one veil. Of these it need only be said that the bibs ought not to be necessary till the child is getting its teeth, and the boots are not necessary until the child is shortened. The hood and cloak should be of cashmere, and the cloak must not be so long or heavy as to drag down the infant's feet—it should just cover them easily. The veil should only be used on cold or windy days, and should be silk open-work. The thick woollen veils generally provided are most dangerous. In sunny weather the nurse must carry a parasol over the infant to shield its eyes.

The washing of babies' clothes is always a difficult question; one careless washing will ruin a set of expensive woollen garments. It is therefore better to have woollen things washed at home; directions as to washing are always provided with all Jaeger garments. If muslin or linen robes are sent to a laundress be sure to send instructions they are not to be starched. It is sheer cruelty to put a baby into starched garments. One of the great advantages of silk robes is that they are not starched; also they are easy to clean, and they do not shrink.

It is usual to short-clothe a baby when three months of age in summer, or four in winter. The same health principles apply to short clothes as to long clothes; they must be loose, light, warm, and easily cleaned, and they must well cover the child.

The following list is sufficient guide without going into details again:—

Four long-sleeved vests; two flannel bodices or flannel stays; four flannel petticoats; four dresses about 24 inches long; four woollen night-dresses larger than the first set; twelve larger Turkish towels; three flannel drawers, buttoning up in front; six bibs; six pairs shoes and stockings, or woollen boots.

The last item is a doubtful one; if the child wants anything on its feet woollen boots are the best. It is getting fashionable now to

let children run barefoot or to wear sandals. With strong children it is a possible plan, and preserves the feet from being cramped and made tender, but there is the danger of treading on nails, &c.

No doubt, as a rule, we wear too many, too cumbersome, and too cramping clothes. The ideal is three garments. For long-coating these would consist of vest, long flannel, and robe. (The binder is quite unnecessary after the first fortnight.) For short-coating, a vest, petticoat, and dress can suffice. A frequent cause of sickness in babies is the tight binder; a frequent cause of bronchitis is low-necked dresses or wet bibs; a frequent source of diarrhoea is chill to the bowels by leaving the child's towels and pilch off when it is cold, or by not changing towels when damp. Always remember to put health before appearances in a child's clothing, and always remember how slight a cause may be fatal to a tiny baby.

The Nursery.—The most important piece of furniture in the nursery is the nurse; a mother should always take over the charge of her infant herself when the monthly nurse leaves, and if she does not thereafter bath and dress and feed it herself, should at least always be present on these occasions and supervise. The practice of leaving infants in the charge of a young untrained girl is often disastrous. If for economy the nurse must be young, then it is most essential that the mother should be in charge; nothing can relieve her of the responsibility of giving her child every chance of a fair start in life, and, as regards health, it is the first year that counts for most.

A nursery should be a light, cheerful room, without much furniture, so that it can easily be kept clean; and without many ornaments or things which the child must be told not to touch. A southern aspect is best, and curtains are unnecessary; let all the sunlight you can into a child's life. The window should be open day and night at the top, unless there is a thick fog, or the baby is having its bath. And the room must have a thorough airing morning and evening, and windows open at the bottom whenever the weather is warm enough. In half-and-half weather it is much better to have a fire and an open window, than to do without a fire and close the window. Only don't put the baby's cot between the window and the fire—a reasoning woman can keep a room well aired without exposing her child to draughts. A thermometer should be hung somewhere near the child's cot, and so far as possible the temperature kept at 62°. Soiled towels, or other garments, must not be washed or dried in the nursery; cooking—except heating the baby's milk—is also a mistake. Slops must be emptied immediately, and all dirty linen taken at once out of the room. A gas-fire is not good; only a coal-fire is really suitable for

a nursery. At whatever time a mother enters the room she should find the air pure and sweet and fresh and warm. A hot stuffy nursery weakens a child and renders it susceptible to cold.

Bathing.—During its early months a baby spends most of its time in its cot—therefore is a cot a most important bit of nursery furniture. The bassinet covered in pink calico and spotted muslin is to be deprecated: a high white-enamelled cot at least 36 inches long and 17 wide, and not more than 10 inches deep, is desirable. Dr. George Müller, the great German specialist on spinal curvature, writes:—"As soon as a child is born and clothed, it must be placed in a cot which is long enough to allow of its little legs being fully stretched out. Padded baskets are most injurious, causing an infant from the first day of its life to lie with a curved spine. The child should lie upon a moderately pliable bed, the spinal column being always fully stretched, and the pillow and mattress stuffed with horse-hair. A small feather-pillow should be allowed as long as the cranium is soft and the great fontanelle unclosed. For covering use a feather quilt, and in winter two blankets." Directly the child gets too big for its cot, supply it with a larger one. Babies should not sleep with their parents. Next to the cot the bath is most important; a bath that stands on legs is very convenient, but if this is too expensive a large shallow basin which can stand on a chair or stool of the right height will do. The baby must always have its bath before the fire, and the manner of bathing must be learnt from the monthly nurse. A baby should enjoy its bath, and get exercise from kicking and stretching in the water, and during drying. The stupid way in which some nurses rub the child's face up the wrong way, or let the soap get into its eyes, is the cause of dislike of bathing in many cases. It shows such a lack of intelligence and of sympathy in the nurse as to rule her out of any well-conducted nursery if done twice. Unfortunately superstition is rife amongst nursemaids, and some will calmly tell you that soap strengthens the eyes; mothers cannot watch too carefully against these nurses' tricks. The temperature of the bath should be 98° F., and the period of immersion only four or five minutes at first, increasing to ten minutes by the time the child is twelve months old. But the child must be kept immersed up to the shoulders, or the part exposed will get chilled. The child should be quickly dried with soft warm towels, and then at once dressed. When put to bed the child should be swiftly sponged all over with warm water. In summer a child of twelve months may be sponged with cold water if it is strong, and the result will be invigorating.

It is always well from the age of one month onwards to hold a child out after its bath, and thus early train it in cleanliness. If a

child is held over the chamber at regular hours of the day, long before it is twelve months old there will be no need of napkins. But so long as there is a need of napkins the mother must see that there is a sufficient supply, and that they are changed directly they are soiled. This will also give her the opportunity of noting the state of the child's bowels, a most important point. A baby's motions should be yellow and semi-solid ; any taint of green, any sour smell, any lumps of curd show that the food is not being properly digested. If the mother is nursing the child herself she must consider whether she is in any way responsible for this state of affairs, and attend to her own digestion. But she must not take strong purgatives, or else her milk will purge the child. If she is severely constipated an enema is the safest method of relief. Medicines should be kept out of the nursery, for some nurses are always going for the castor-oil bottle. The safest laxative for a baby is a piece of manna no larger than a hazel-nut, or a teaspoonful of the best olive oil. When a child can sit up it should be put on the chamber every morning after its morning meal, and kept there several minutes. But don't let the child go on straining. The habit of securing an evacuation of the bowels every morning is one of the best bits of training a mother can possibly give her children ; nothing conduces more to health and happiness. Never neglect diarrhœa in children, for it is specially fatal to babies ; if it persists for twenty-four hours send for the doctor. It is generally caused by uncleanly surroundings of some sort, and is most frequent in bottle-fed babies. See that after each meal the child's mouth is swabbed out with some boric lotion. Be sure the nipples are cleansed before and after each meal. Examine the cot, see that no dirty napkins are in the room, and that the child's skin is cleansed (not merely powdered) when the napkin is changed. Diarrhœa is generally due to neglect of some of these points, or to want of fresh air. If the nursery and the child are kept clean and sweet there ought to be no trouble.

Exercise.—During the first fortnight of life a child can be carried up and down the nursery for half-an-hour, but should not be taken out-of-doors unless the weather is exceptionally still and warm. The German and Italian method of carrying a young baby on a pillow is easier for the nurse and more comfortable for the child. The pillow must be small and fairly firm. After a fortnight the child can be taken out for its daily walk, if the weather is mild and dry ; damp and east wind must, however, bar outdoor exercise. After a month old the child should live out-of-doors as much as possible in summer ; it can even have its cot outside, and either sleep or lie and kick. But if a child is born in winter, the mother must be very guarded about out-

door exercise, and keep it in according to her discretion. If it goes out, it should be in the middle of the day, and the nurse should have strict orders not to go shopping or to loiter about. Never expect a nurse to carry a child too long—she will get tired, and carry it carelessly, and perhaps injure its back. Half-an-hour is as long as most women can carry an infant at a time. After two months of age the child can be taken out twice a day in its perambulator—provided the perambulator has a mattress on which the child can lie flat, and runs on rubber wheels. In winter a hot bottle, well wrapped up so as not to touch the child, can be put in the perambulator, and then, tucked up in its Shetland shawl, the infant is as warm as if in the nurse's arms. A child should never be carried in a sitting posture till after the fourth month, and then the back and spine must be supported with care. About the ninth month the child generally begins to crawl, and loves to lie on a rug on the nursery floor, or on the grass in summer, and try and drag itself along. This is good exercise, but do not encourage the child to try and walk until it is over a year old; the result may be bow legs. No violent exercise is good for infants. They should never be swung vigorously in their cradle, jolted up and down on the nurse's knee, or tossed up above a loving but thoughtless father's head. And always hold a child firmly; when it is young it gives it a feeling of security. Many a crying child ceases its wailing when it feels itself safe in its nurse's arms, its body and head resting against the breast and arm of the nurse, and its thighs grasped by her outspread fingers, whilst its spine lies straight along her forearm. Besides, a baby occasionally makes springy, jerky motions, and may thus tumble out of its nurse's arms or fall off her knee; many injuries have taken place in this way. From five months old a child can be given some toy to grasp and wave about, and thus exercise its arms; the toy should be soft, and not painted—for it will inevitably go to the child's mouth! The recognition of toys, birds, and flowers are milestones of intelligence that the mother will delight to notice.

General Conclusions.—Though it is possible to train a baby very young by force of habit, there must of course be no question of "punishing" a child that is too young to reason. And often the only idea of training a nurse carries away from the village school is to beat and scold; therefore watch the nurse very carefully in these matters, and give her very definite instructions that she is never to shake or slap the child.

Teach the child to sleep at regular times, and never have it roused from its slumbers to show to visitors. A baby is better with as few visitors as possible, and should never be used as an adjunct to afternoon tea in the drawing-room.

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With regard to the amount of sleep to be expected from a baby, Mrs. Hewer says:—"At six months a healthy child should settle off at 6.30 P.M., be taken up and fed at 10 P.M., and then sleep till 6 or 7 A.M. During the morning and afternoon it should have two good sleeps of $1\frac{1}{2}$ hours each." Under six months a baby should sleep nearly all day. Over twelve months it is better to give the child one good sleep, either from noon till 2 P.M. or from 2 P.M. to 4 P.M. as may be most convenient, but always at the same hour. If the child will sleep after its midday dinner it is best, for then it need not be put to bed so early. Seven o'clock is quite soon enough if you don't wish your child to wake you at 6 A.M.; few children will sleep more than twelve hours at a stretch.

A restless child generally means too much or too little bedding, and if a child begins to cry in the night don't at once provide food, but see if it is too hot or too cold, or if it has wetted the bed, and needs changing.

A fretful child is probably ill, and the mother can read up infantile ailments and watch carefully. But it is somewhat late to study healthiness for children when baby is already sick. It is to be hoped that in the future every woman when she first finds she is about to become a mother, will recognise her responsibilities, and seek at some suitable source a knowledge of the duties that lie before her. Scattered gossip of elder women is not recommended, but rather study of some work written by a medical man or woman. Half the babies who die, die from preventable diseases; and it is possible for the careful mother to banish all infections, and nearly all illnesses, from her nursery, and thus secure to her offspring the richest of all inheritances, sound health and happiness.

SECTION X

THE HYGIENE OF INFANCY

FROM the moment a child is born it may be said that to ensure its welfare it requires to be brought up according to hygienic principles. We can realise the high importance of this statement when we reflect that a very large share of the health and physical welfare which the child may enjoy as an adult must depend upon its upbringing not merely in the earlier years, but in the earlier days and weeks of life. We find, for example, that the *feeding* of the infant is a subject of

vast importance in so far as its welfare is concerned. In the second instance, it must be subjected to the influences of fresh air and healthy surroundings at large, whilst in the third place it resembles the adult in that its existence must be regulated according to those principles of hygienic science which have been proved by long experience to constitute the basis of the physical safety of the race.

The Possible Results of Infant Hygiene.—Errors in the bringing up of children are unfortunately many and varied. In the first place the feeding of the child is a subject much neglected or misunderstood by mothers. Secondly, we find that sundry errors of hygienic principles are also perpetrated in the matter of the exercise, clothing, and sleep of the child; while in the third place, when a child has advanced beyond the stage of infancy the care of the mother is frequently withdrawn, and this period of existence is left very much to the care of chance. We must not neglect also to note that, in respect of the *education* of the child and of the amount of physical exercise it enjoys, we have to consider very closely the conditions under which it may be thus made by attention to the rules of hygiene to grow into a healthy adult. In the present section of this work it is proposed to deal entirely with questions of the hygiene of infancy, or, in other words, with those laws and rules adapted, when put into practice, to assist the healthy upbringing of the normal child. The diseases peculiar to infancy will be separately treated, that which concerns us here being the application of the science of hygiene to the growth and formation of the healthy infant body. We have already seen that the foundations of the healthy adult are laid in the period of infancy. The old proverb, “as the twig is bent the tree inclines,” very accurately expresses the fact that what the adult is to become largely depends on what the infant is. Another most important consideration connected with the hygiene of infancy is that it teaches us that, supposing a child to be born of a stock or parentage which may be termed diseased or weak, it is still possible by extreme care in the management of such an infant’s life, continued onwards from childhood, so to modify and effect its constitution that it may be able to take its due place in the world as a healthy adult.

Heredity and Infancy.—For an illustration of this all-important truth we may take the case of the child of gouty parents. If such a child is badly brought up, in respect of food and other items of existence, the chances are that the gouty tendency will sooner or later appear in its constitution, whilst we have also to consider the risk of premature decay and death in such a case from gouty troubles. Suppose, on the other hand, that such a child is carefully attended to from its birth in all aspects of hygiene which concerns its welfare it

then starts life with a prospect of attaining, not merely to a healthy adult life, but likewise to a healthy old age. In such a case the child, passing beyond the stage of infancy, would require to be carefully fed. Its diet should be of a non-stimulating character, alcoholic liquors should be absolutely forbidden, and an excess of meat-foods prohibited. Due attention should also be paid to the action of the skin and to the practice of sufficient bodily exercise. Carried out on these lines the regulation of the life of a child born of gouty parents would probably result in the growth and development of the child into a healthy adult, in whose case no attack of the disease would be likely to appear. Other examples of the powers which a regulated hygienic existence for children may accomplish, in overcoming disease tendencies bequeathed to them by parents, can be found in those who have been born of a stock in which an unstable nervous system tending towards insanity has been represented. Here, in addition to attention being paid to the feeding and other ordinary details of life, we require to ensure that, in respect of its brain-work, the child is not overtaxed. It is here a case of building up a healthy body, and of thus ensuring the development of a healthy brain which is not unduly exercised in the work of education. These examples tend to show us that the legacies of physical defects which children inherit from their parentage, and also from a more remote ancestry, can be overcome through the effects of judicious upbringing from the period of infancy onwards to that which concerns the regulation of adult life. It is also to be borne in mind that an improvement in health in the case of one generation, as the late Sir John Simon puts it, is capable of being handed on in increased force to succeeding generations.

The Nursery.—There are no special details to be given regarding the arrangement of the nursery other than those which have already been indicated as proper to the health conditions of ordinary homes. It is difficult in the case of the masses to lay down distinct laws for the separation of children from adults, and for their accommodation in a special room or rooms, seeing that the housing problem itself, with all its demonstrations of want of space in ordinary houses, presents at present insuperable difficulties in carrying out the provisions of hygiene. - The institution in poor districts and towns of *day-nurseries*, where children can be duly attended to while their parents are absent on their bread-winning mission, or where, from limited accommodation at home, it is desirable for infants to be kept, through the day at least, in pure surroundings, has proved a distinct boon to the masses of this and other countries. There can be little doubt that such "day-nurseries" contribute very largely to the diminution of infant mortality amongst the working classes, although, on the other

hand, it is to be feared that in many instances the good obtained by the infant through the day in the public nursery may be lessened or counteracted by its surroundings at night. What at least is required in the case of an infant which it is desired should be brought up healthily is a sufficient supply of fresh air, absolute cleanliness of its surroundings, and the proper administration at proper times of pure food, attention being also paid to the matter of its clothing.

Some Details.—It is necessary here to enter into details concerning the means to be adopted for procuring a due supply of fresh air, and also for ensuring the cleanliness of surroundings. The remarks already detailed in the section on "Hygiene," dealing with the house itself, may be taken as applying with especial force to the home-environment of the infant. That which more especially concerns us in the present instance is the enumeration of the rules relating to the *feeding* of young children, and to certain other details of their existence, such as are calculated materially to affect their welfare. Taking first of all the sleeping arrangements of the child, we may remark that *sleep* for the young infant is a condition without attention to which its health cannot be secured. The first few months of an infant's life are largely spent in the sleeping state. The young child here may be regarded as hardly awaking to consciousness until it has materially advanced in growth. Sleep for the infant practically means nourishment, hence the great importance of securing for it plenty of sound and undisturbed rest. It may be regarded as a fixed rule that in the first three or four years of life a child requires double the amount of sleep necessary for the adult. It must thus enjoy twelve hours sleep; whilst if in the middle of the day a nap can be obtained by the infant, such a practice will tend towards its further healthy development. The influence of habit soon makes itself felt in the matter of the sleep of young children. If the mother or nurse is careful to put the child to bed at the same hour each night, habit will exert its power and force in causing the infant unconsciously to exhibit a desire for sleep at the appointed time. As a rule, children who exhibit irregular habits in the matter of sleep will be found to suffer from some error or other on the part of the mother in respect of the regularity of obtaining repose; or they may, through unwise habits of feeding, be disturbed when they ought to be wrapped in slumber. The old-fashioned rocking-cradle may be regarded as a thing which is not only unnecessary but in some cases injurious to the child. There is no more adequate reason why the child should be rocked to sleep than exists for an adult. Again, it is of high importance, with regard to the sleep of the child, that it should never be suddenly wakened, inasmuch as a certain amount of nervous

shock may be thus conveyed to the infant. When the child has grown somewhat, the amount of exercise it is able to take, even in rolling about or crawling, will exert a tendency in producing a certain amount of weariness which favours sleep. Also it is of importance that a child should not be put to sleep immediately after a meal. Digestion is a process which essentially requires the waking state for its due performance. Hence, just as the adult who goes to bed immediately after supper is likely to pass a disturbed night, so in the case of the infant, disturbance of sleep may result when digestion follows immediately after the taking of food.

Infant Sleep.—It may be said that, where an infant does not sleep regularly and peacefully, there is need for the mother to institute an examination into all the conditions of its existence, and to revise especially its food-habits. Fretful children may, for example, suffer much through the process of teething. Hence arises what one may describe as a natural tendency, on the part of the parent, to administer to the child some form or other of soothing or sleeping draughts. As most of these mixtures contain opium in one shape or another, and as opium in all its forms is a drug which should rarely be administered to children at all, and then only by a doctor's orders, we readily see the tremendous amount of harm which may be done by giving to children such medicines. There are very few cases in which an intelligent woman cannot soothe her child to sleep without any drugs whatever being required. The infant which cries is undoubtedly in a state of pain or discomfort, mostly arising from some digestive trouble, which, as has been indicated, an examination of the feeding arrangements should be sufficient to correct.

Overlaying.—It is advisable that the child should not occupy the same bed as the mother or nurse. Cases of what are called "overlaying" children, resulting in the smothering of infants, are frequently reported on account of this habit. It is said that the number of children suffocated each year in London alone from overlaying reaches nearly one thousand. A certain proportion of these cases, no doubt, may be regarded, unhappily, as due to the drunkenness of the mothers. The child should therefore always be placed in a cot by the side of the mother's bed, so that the danger in question may be avoided. Many mothers commit the mistake of wrapping up their children too warmly. It is of importance, of course, to see that the bed-clothes of the child are sufficient to protect it against the effects of chill, but this is a very different matter from overloading the body of the child with clothing; and above all, the mother, in addition to securing a due supply of fresh

air for her infant, should see to it that its head is always free and uncovered.

Outdoor Exercise.—With regard to the outdoor exercise of young infants, it is regrettable in these latter days to see that many young children are conveyed in “baby-carts” in which they are compelled to occupy a semi-erect position. This is entirely an erroneous procedure, for the reason that the spine of an infant does not develop the curves adapted for the erect posture until it has begun to walk on its own account. The old-fashioned perambulator in which the child is allowed to lie in the flat position is infinitely preferable to the “baby-carts” just alluded to. Many deformities of the spine are undoubtedly produced by the adoption on the part of mothers of an unnatural position for their infants. The exercise of the infant itself is also a matter of extreme importance. If, taking nature as our guide, we watch the movements of a very young child, we shall find that it delights in putting its muscles into action. The clothes of the child should therefore, when it is at home, and indeed when it is out of doors as well, not restrict its movements. When at home it should be allowed, under proper supervision, to roll about on a rug or mattress, and in this way to enjoy a certain amount of exercise. The late Sir William Jenner, remarking on this fact, says:—“A child in health rejoices in movements of every kind. It joys to exercise every muscle. Strip a child a few months old, and see how it throws its limbs in every direction. It will raise its head from the place at which it lies, coil itself round, and, grasping a foot with both hands, thrusts it into its mouth as far as possible, as though the great object of its existence at that moment was to turn itself inside out.”

The Feeding of Children.—The typical food of the infant is undoubtedly *milk*. This is the food upon which nature intends that, not merely the young human being, but the young of all animals belonging to man's own class should be fed. It is greatly to be regretted that at the present time a very large number of women appear to be disinclined to discharge the ordinary duties of motherhood, in that they refuse, from one cause or another, to suckle their infants. Hence we are compelled to consider first, the natural process of suckling an infant, through which it obtains a due supply of its mother's milk, and second, the process of what is called “hand-feeding,” whereby children are fed on substitutes for the mother's milk. It is undoubtedly important, in the first instance, that if a mother is to suckle her child, she must be of good health and her milk of healthy quality. It would be inadvisable, for example, for any mother suffering from consumption to attempt to nourish her

infant, and the same remark holds good of a mother affected with any other constitutional disease. Where a *wet-nurse* is employed, the woman selected to nourish the child with her milk must be ascertained to be in a state of perfect health. A woman from a country district is always to be preferred, assuming she is healthy, to a wet-nurse obtained from a town. Naturally, in this case, the services of the doctor should be obtained by way of ascertaining that the wet-nurse is calculated to fulfil perfectly all the functions of a deputy-mother. The personal history of the wet-nurse should be intimately inquired into, and the health of her own child should also form the subject of investigation. In so far as the suckling of children is concerned, a caution should here be given against the undue use of stimulants on the part either of the mother or the nurse. There is, for example, a prevalent idea that a nursing woman requires a certain quantity of such a beverage as porter or beer each day. This is an entire mistake. The food which is necessary and adequate to duly support the body of the nursing woman should be perfectly adapted to afford a sufficient supply of milk for the infant. Children fed on the milk of women who indulge in stimulants are apt to develop various ailments. Hence the mother or the wet-nurse, as the case may be, should be most careful regarding the use of alcohol in any form.

Human and Cow's Milk.—The hand-fed child, as a rule, is brought up on cow's milk. Human milk contains, in a hundred parts, about eighty-nine parts of water and eleven parts of solids, these latter consisting of caseine, or "curd," fat (or butter), sugar of milk, and minerals. Cow's milk, on the other hand, contains about thirteen and a half solids in a hundred parts. It is richer in caseine, fat, and minerals than is human milk. Hence, to bring cow's milk nearer to the composition of human milk, water is added and also sugar. Here it is necessary to give a caution against the addition of too much sugar to cow's milk, and the sugar which is added should be the *sugar of milk* itself. Failing this, pure white sugar may be employed, the proportion being a teaspoonful to half a pint of milk and water. Another important consideration regarding the use of cow's milk is that seen in the action of the infant's stomach upon it. The clotting of the "curd" of cow's milk takes place in a coarser fashion than does that of human milk, so that it is desirable to add a little lime-water to the cow's milk in the proportion of from a quarter to a one-third part of the amount to reduce the cow's milk, so to speak, to the level of the human fluid. Lime-water may be made as follows:—Pure distilled water should be placed in a large jug; to the water a few pieces of unslaked lime should be added.

The water should then be stirred and allowed to stand for some hours. The clear fluid consisting of lime-water should then be poured off into a clear stoppered bottle. It can then be used for the dilution of the milk as described. Barley-water is also an excellent means of modifying cow's milk for easier digestion by the infant. It need hardly be remarked that the cow's milk on which an infant is fed should be obtained from a dairyman who guarantees the product to be free from all disease germs. Milk which has, in fact, been sterilised, should alone be used for the feeding of infants. Where this process has not been carried out at the dairy, it may be readily effected at home through the use of an ordinary steriliser, which any ironmonger will supply.

Infants' Foods.—It is occasionally necessary in the artificial feeding of infants to add to their milk certain so-called "infants' foods." Where any infants' food is employed, it should only be of a class in which the starch it contains has been converted into sugar. Many such "infants' foods" are now sold, four of the best being known as Nestlé's Food, Mellin's Food, and that made by Savory & Moore and by Allen & Hanbury. It is needful here, however, to give an important piece of advice to mothers to the effect that such foods must not be used to the exclusion of milk. If a child be fed upon such foods exclusively, it may be apt to develop the disease known as *infantile scurvy*, indicated by general disturbance of the child's system, and also by changes at the ends of the bones especially.

The Times of Feeding.—With regard to the times of feeding, if the mother is suckling her child, it may be fed every two hours at first, physicians advising that each breast should be alternately used. Later on, the child may be fed at an interval ranging from two-and-a-half to three hours, and it should be gradually accustomed to a longer interval between the periods of feeding at night. In this way from four to six hours will soon represent the intervals between each time of feeding. It is of great importance to ensure regularity in the feeding of an infant, so that the child may, through the effects of habit, waken for its nourishment, and thus enjoy its natural amount of repose. To feed a child every time it cries, under the idea that of necessity it must be hungry, forms a gross error in the bringing up of infants. The cry of the child may arise from pain, and may not in the least indicate a demand for food. Hence, it is extremely necessary that the mother or nurse should be careful to ascertain, as far as possible, the conditions and causes through which the restlessness of the child is produced.

The Nursing Bottle.—Infants are usually hand-fed by means of *nursing* or *feeding bottles*. Great errors are often exhibited, not

merely in the choice of a feeding-bottle, but also in respect of its treatment. The old-fashioned bottle is one of a somewhat boat-shaped form, and has a teat at one end. It is easily cleansed, and possesses no tube, this last want constituting a special advantage, in so far as the welfare of the infant is concerned. For it is an extremely difficult matter to ensure that the tube itself is of a cleanly description. It need hardly be said that, whilst a feeding-bottle may be perfectly cleansed, so that its contents can suffer no injurious changes, its tube, through which the milk passes, may, through carelessness, contaminate the food-supply of the infant. If a tube be used at all, there exists, therefore, the utmost necessity for seeing that it, as well as the bottle, is thoroughly cleansed. Every feeding-bottle should be marked, so as to enable the mother to estimate the amount of food which is given. A very useful addition to the bottle is that which includes a thermometer in its furnishings, so that the heat of the food can be duly guaranteed. The degree of heat of the food of an infant should, on an average, represent ninety-eight degrees. It is of high importance that more than one feeding-bottle should be used, so that whilst one is in use the other may be purified. After every meal the feeding-bottle should be washed, and no remainder of any food-supply should again be used in feeding the child. The feeding-bottle should be rinsed out in warm water, to which a little bicarbonate of soda has been added, and thereafter rinsed out in pure cold water. It is highly necessary to remember that the tube and teat should similarly be cleansed by being thoroughly flushed by pure water. Observation of these precautions will prevent fermentation or other injurious changes happening to the next supply of milk placed in the bottle.

Amount of Food.—With regard to the amounts of food necessary for the nourishment of an infant during the first year of its life, we may assume that, from the period of birth to the age of six weeks, the child requires about ten meals in the twenty-four hours, each meal averaging in amount from one to two ounces. From the period of six weeks to three months an authority lays down the rule that each meal must amount to from three to four ounces, the number of meals given in the twenty-four hours being eight. From three months to six months, from four to five ounces are given at each feeding, the number of meals in the twenty-four hours being seven. From six months to nine months, the daily number of meals is six, the amount given to each varying from six to seven ounces. From nine months to twelve months, each meal should consist of from eight to nine ounces, the number in twenty-four hours being five. It is generally agreed that at the age of

twelve months the use of the feeding-bottle should cease. The child may then eat from the spoon or may drink from a cup. The mother or nurse must gradually accustom the child to the different mode of feeding, and, in some cases, difficulty may be experienced in inducing the child to take its nourishment in the new fashion. An important consideration is that which concerns the change of diet necessary to be made from that we have already indicated as proper to the purely infantile stage of existence. Dr. Ashby, dealing with the food of infants proper to the age ranging from twelve to eighteen months, gives a typical arrangement of a diet, as follows:—The first meal is given at 7.30 A.M.; a breakfast cup, eight to ten ounces of thin hominy, oatmeal porridge or meal should be made, two-thirds of this being meal, or bread and milk may be substituted for these items. The second meal is given at 8.30 A.M., and consists of a cup of milk, diluted with barley-water. The third meal is given at 12.30 P.M., and may consist of beef-tea, mutton-broth, or chicken-tea thickened with bread-crumbs or a little finely-divided potato, or of some little roast pudding, with the pulp of a roasted apple, or of stewed prunes. The fourth meal is given at 5 P.M., and resembles the first meal. Substitute rusks, or fine bread-crumbs, for the hominy or porridge. At 9 P.M. the fifth meal is given. This consists of warm milk, with a little lime-water or barley-water added. When the child has attained the age of eighteen months, it may be allowed small amounts of fish, fowl or meat; the diet must be of a plain description. Soups are also permissible, and potatoes mashed, with milk. Rice or tapioca puddings, apples, or the like, are also excellent; but all rich foods, such as pastry, and those containing suet, should be avoided. No wiser remarks than those of Dr. Ashby can be quoted in respect of the feeding of children at the age mentioned. "While it is well," he says, "to introduce a variety in their diet, it is a great mistake to indulge them with rich and tasty kinds of food, especially at breakfast or tea. The greatest difficulty comes in when they are allowed to sit at the parents' table, or are brought down to the dining-room after their nursery meal, and too often are encouraged to supplement the latter with the more tasty dishes from the parents' dinner table. Especial stress must be laid on accustoming the child to eat slowly and to masticate its food. All forms of food should be shredded; that is, cut or torn up with a knife or fork, or put through a mincing-machine. Meat, especially if over-cooked and hard, is likely to escape digestion and pass through the system. All through childhood it is of the greatest importance to feed children only at meal times, and not give them biscuits, sweets, ginger-bread at any hour, simply because they ask for them.

The stomach requires rest like every other organ, and cannot get on without it: it is certain to be in an unhealthy condition if it is called on to work at all sorts of times and seasons."

Weaning.—Supposing a mother to suckle her child, the further question arises when the process of suckling should naturally terminate. Physicians regard from seven to eight months as the natural period for the suckling of a child. This period is, however, apt to be unduly extended, in which case the health, not only of the infant but of the mother, is apt to suffer. In women who oversuckle their infants it is true the supply of milk may be abundant, but it is found to be of extremely poor quality, insufficient to nourish the child properly, and in such a case, although the infant may appear even fat, its bodily increase is not of a healthy description. Many women continue to nourish their children unduly as regards time, under the idea that the process of *lactation* or *suckling* prevents the appearance of menstruation, and thus renders them non-labile again to become pregnant. This is entirely a mistaken idea, because menstruation may occur during the process of nursing. It is, therefore, of importance to see that the suckling of the infant is not carried on unduly, and that after the seventh or eighth month the milk of the mother should be supplemented by the artificial diets already described. With regard to the details of the weaning process this must be accomplished in a gradual fashion. It is recommended that two bottles of milk should be given to the infant in the first instance every twenty-four hours instead of giving it the breast. Preferably one of these bottles may be given at night. As the child gradually gets accustomed to the artificial food the breast food may be allowed to pass into abeyance. A wise counsel is that which advises that infants should not be weaned through the hot months of the year, seeing that a greater tendency then exists to the development of that terrible trouble *infantile diarrhæa*, an ailment specially fatal to hand-fed children brought up in our large centres of population. An additional caution may here be given to the effect that, by way of preventing this disease in the case of artificially-fed infants, all milk in hot weather should be duly sterilised, and should be kept in a situation where it is not liable to be contaminated by dust or other forms of pollution.

The Weight of Infants.—A good deal of importance is attached by physicians to the weight of infants, this detail serving as a guide to their efficient progress. The average weight of a child at birth may be taken as ranging from $6\frac{1}{2}$ lbs. to $7\frac{1}{2}$ lbs. Children born much under the average weight have, however, been known to survive. Infants weighing only 4 lbs. have been reared. It appears that for a few days after birth a loss of weight takes place, but by the eighth

or ninth day the original weight is made up. We may here repeat the table compiled by Dr. Pfeiffer which fairly indicates the average gain of the infant:—

	lbs.	ozs.
Weight at birth	7	0
" " fourteen days	7	6
" " end of the first month	7	13 $\frac{1}{4}$
" " " " second month	9	9 $\frac{3}{4}$
" " " " third "	11	4 $\frac{1}{2}$
" " " " fourth "	12	14
" " " " fifth "	14	3
" " " " sixth "	15	8
" " " " seventh "	16	9
" " " " eighth "	17	14
" " " " ninth "	19	5
" " " " tenth "	20	9 $\frac{1}{2}$
" " " " eleventh "	21	4 $\frac{1}{2}$
" " " " twelfth "	21	11 $\frac{1}{2}$

Other Hints regarding Feeding.—It is well to remind ourselves here that, in so far as the feeding of infants is concerned, the reason why *no starchy food should be administered to any infant under the age of, say eight months*, is found in the fact that the saliva of the child is unable to effect the conversion of the food into a sugar, as is the case after the age mentioned, this action taking place all through adult life. All the starch we eat in fact requires to be converted into sugar, in order that it may be suitably applied to the uses of the body. Nature, as we have seen, places ready-made sugar in the milk in the shape of the *sugar of milk* described as forming part and parcel of that fluid. To give a young child, therefore, artificial foods containing unchanged starch is a proceeding tantamount to loading its stomach with undigestible material, and a large amount of the mortality of young infants must undoubtedly be traced to erroneous modes of feeding of the kind described. We have shown the high importance and absolute necessity of milk as a diet for the infant. When the child has passed beyond the stage of infancy milk should also form a certain proportion of the diet. The administration of a certain amount of *fat* in the food of children is also important, because fat is not merely required for body-building purposes but also aids the digestion of other foods. It may be conveniently given in the form of cream. Eggs are also an excellent form of diet for children, but they must not be administered too frequently, and should always be lightly boiled or poached. Potatoes, mashed with milk or gravy, are also serviceable in the nutrition of children. Potatoes, however, must not be given in excess. Green vegetables are permissible, as also are

cooked fruits, rice, and like puddings. Oatmeal, in the shape of porridge, or of dishes made with oat-flour, is also excellent. Stale bread alone should be used for children's nourishment. Wheaten biscuits are also recommended as tending not merely towards bone-formation but also to the prevention of constipation. To marmalade also no objection can be entertained, but any excess of sweets is to be avoided. Many of the sweets allowed to be consumed by children are of injurious quality, and it would be well, therefore, if mothers would limit the consumption of such articles to pure forms of chocolate, of which "Fry's Milk Chocolate" forms one of the most typical and nutritive examples, owing to the extreme purity of the materials of which it is composed. It need hardly be said that alcohol in all forms is absolutely injurious to the young and growing body. It will be well if tea and coffee be also avoided in the case of the growing child. As has been said, milk should form its staple fluid, but there can be no objection to giving occasionally a small amount of pure cocoa.

Incubators.—Where children are born prematurely, they may be reared successfully in what are known as *incubators*. An incubator is essentially a small chamber or case in which the infant is placed, the chamber being duly warmed and ventilated. Many children, born either prematurely or weakly, have been successfully reared in the earlier part of their existence through the means just described. The bringing up of such infants naturally forms a very difficult task, and one which requires to be duly supervised and carried out under the supervision both of a medical man and of a nurse.

Bathing.—The bath forms a most important item in connection with the hygiene of infancy. It is not alone sufficient that the nursery should be maintained in a state of absolute cleanliness, both as regards its cleanliness and as regards its ventilation. A young child requires to be daily bathed by way of personal cleanliness. The proper time for bathing the young infant is in the morning. Later on, the child may have its bath at night, this last constituting a soothing measure predisposing to healthy sleep. The temperature of the bath may vary from 70° F. to 90° F., this latter temperature being necessary in the colder seasons of the year. The morning bath suffices not merely to cleanse the skin of the infant and to promote its free action, but also acts as an ordinary cleanly measure in case there has been any fouling of the napkin during the night. In the case of weakly children, it is usually recommended that it should not be bathed, but sponged over with warm water. Great care must be taken in testing the temperature of the water of the infant's bath. Seeing that the skin of the infant is highly delicate, any undue

temperature is apt seriously to affect it. The temperature of the nursery should be kept at 60° F. as its lowest point, and the child duly protected from draughts. The use of a pure soap is necessary here, and the mother or nurse should pay special attention to washing the groins, armpits, and also the folds of the skin at the neck. It is better to use soap first of all as the infant is laid in the lap, and then to place it in the bath so that the soap may be removed. Soft towels only should be used for drying the infant. Where any irritation of the skin exists an ordinary pure dusting powder may be used.

The Clothing of Infants.—The clothing of infants constitutes no unimportant part of their hygienic conditions. In the young body heat is more readily parted with than in the case of the adult. We have also to take into consideration the fact that the conservation of heat means much more to the young child than to the grown-up individual. Therefore it is that the young child requires to be carefully protected against the effects of cold and chill, causes which are much more likely to produce serious ailments in the case of infants than in the case of grown-up persons. A chill in an infant may not merely result in the production of chest-affections, but may cause stomach and bowel complaints, as well as other ailments. The necessity, therefore, for seeing that the child's clothing should typically consist of woollen materials becomes obvious. Wool forms, in one shape or another, the only suitable material for the dress of the infant. The clothes again should be made of a tolerably light character, and all injurious constriction should be avoided. The dress of an infant, like that of an adult, is meant to conserve heat, and wool, being a non-conductor of heat, is the material most serviceable in carrying out this end. Next to the skin of the infant most mothers prefer to use some material of the nature of cotton, but this last presents no advantages over a flannel of thin and smooth quality. The clothes of young children should be made to open in front so as to avoid the too common practice of turning and twisting the body in order to put on or remove the clothing. No pins should be used in fastening an infant's clothes. Even safety-pins may form a source of pain, if not of danger. Strings or buttons form the only means of fastening which should be allowed. Most physicians are very decidedly opposed to the use of the *binder*, although this appliance is necessary in the new-born child to keep the navel-dressing in position, whilst it also contributes to the warmth of the abdomen. The binder is, however, not necessary after a very short time, and should be replaced by an ordinary belt made of soft wool. All tight bind-

THE BABY'S TOILET



First wash the Head



And then the Body.



Puff under the Arms



And other tender parts.



THE BABY'S TOILET



Pinning the Binder.



Arranging the Barracoat.



Applying the Napkin.

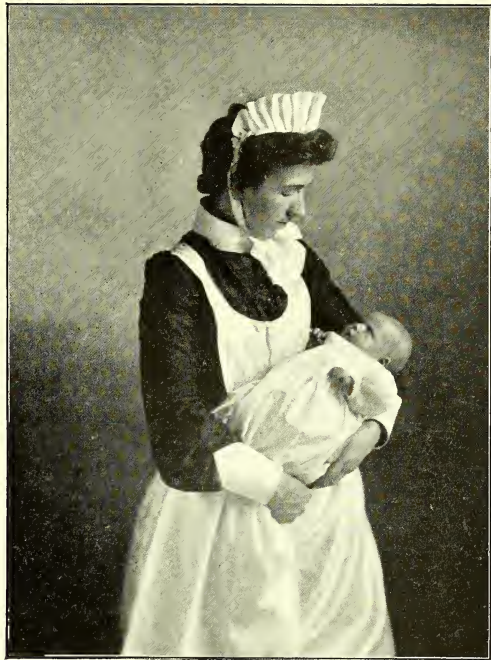


Bringing together the Flaps and Pinning.

HOLDING THE BABY



How not to hold the Baby.



The Back should be well supported.



How to soothe, and



How to feed the Baby.



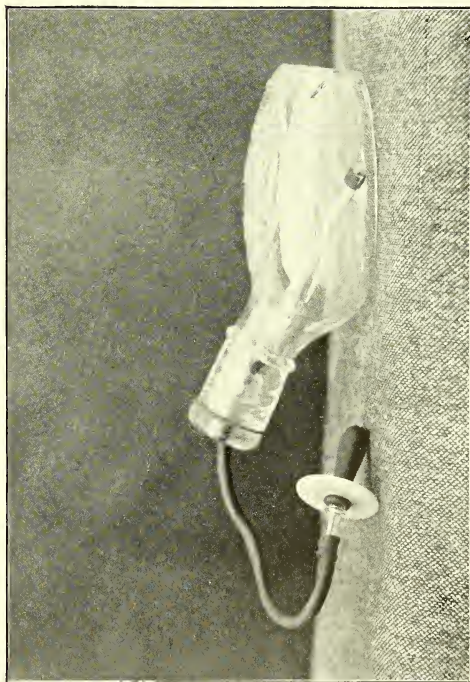
THE BABY'S FEEDING-BOTTLE



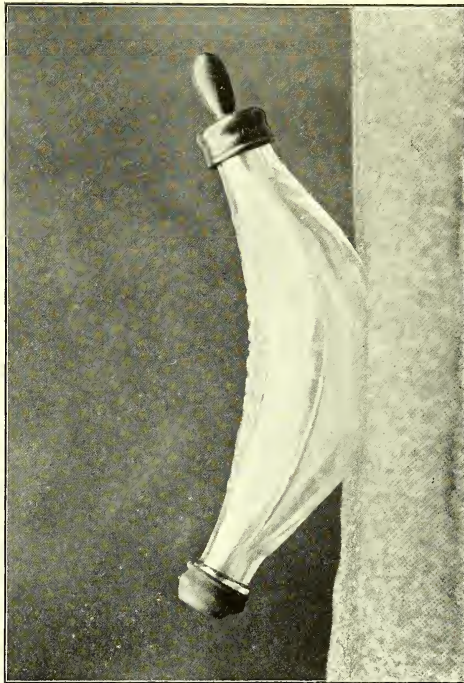
How not to put the Baby to sleep.



Inevitable consequence.



The Bottle with a long tube is not to be recommended.



The ideal Feeding-Bottle.



ing of an infant's abdomen is erroneous. The chest is usually included in the operation of applying the binder, and, where this is the case, the free movements of breathing may be seriously interfered with. The infant's cap is now, as a rule, condemned by doctors, inasmuch as it tends unduly to heat the head. Nurses to-day are in the habit of using an ordinary head-flannel as a substitute, which is simply placed over the infant's head when carried from one room to another. The nightgowns should be of looser nature and lighter than its day-clothes. When the infant requires "shortening," an operation generally performed on the clothes about the third month of life, consideration should be given to the infant's state of health. We can readily understand that a change made in cold weather from short garments may entail serious consequences in the way of cold and chill. With regard to the head covering of infants, it should be noted that their eyes must be carefully protected from the direct rays of the sun. It is sad in many cases to witness little children being wheeled in perambulators or baby-carts with their eyes or head insufficiently shaded. For summer use a very light straw hat, or an equally light hat of the "Tam o' Shanter" kind, should be employed as part of the dress. Young children should not have the legs or arms bare, except it may be in the warm weather of summer.

Foot-Clothing.—With regard to the *boots and shoes of infants*, much harm is done by mothers when fitting the child with its first pair of shoes by buying articles which are not adapted for the foot of the child, especially in respect of their smallness. It can be readily understood that the bones of the child's foot are of a somewhat soft and yielding nature. Hence undue pressure of a shoe, which will act unfavourably in the case of an adult, tends more powerfully still to affect the due symmetry of the foot of the child. It has been noticed that in radiographs of adult feet, which apparently were undeformed, the end bones of the toes seemed to be misplaced. This result was due to the fact that in early life the subjects of the deformities had their infantile toes unduly pressed by shoes not adapted for them. Every mother, therefore, should make it her business to see that the shoes of the young child are of roomy and large description, and thus adapted to afford every opportunity for the natural growth of the foot.

The Nervous System in Young Life.—A considerable portion of the hygiene of infancy and childhood is that which entails the necessity for great care being exercised in the development of the brain and nervous system. This topic naturally relates itself to the larger one of *education*. In a treatise of this kind nothing may be said regarding the modes of educating the young, this topic belonging

to a special department of mental science. The physiologist and physician, however, join issue with the educationist in respect of the interest they exhibit in what may be called the nervous development of the child. A primary caution which parents should strictly heed, especially in these days of great mental competition, is that which warns them against the effects of over-stimulation of the young nervous system. There undoubtedly exists an evil tendency in modern times, represented by the idea that the human brain may be made to discharge its duties at an earlier period than was hitherto regarded as a suitable one for the exercise of mental qualities. The brain exhibits not merely a gradual development, but one which is probably much slower than is represented in other organs and systems of the body. We have already spoken of the absolute necessity for affording a sufficient amount of sleep to the young child, seeing that sleep represents here, not merely repose, but also nutrition. It thus presents us also with a condition, through which the process of growth, so necessary for the development of the infant, can be properly carried out. On the principle laid down by a great physician, that "on the whole it is better to be healthy than learned," we may, therefore, deprecate all attempts to educate young children before the proper time arrives for the exercise of the teacher's functions, and before the nervous system is equal to the strain thus made upon it.

Education.—As a rule the education of the child should not be commenced before the age of four-and-a-half or five years. Great improvements of late days have been made in educational methods, whereby young children are led towards a knowledge even of the alphabet, in a manner calculated to arouse their interest, and to fix more definitely upon their minds the items it is desired they shall acquire. Before the sixth year of life no child, as a rule, should be occupied with brain tasks for a longer period than an hour per day; this period we may be well advised if we divide it into two parts, thus saving brain strain on the part of the young body. The tendency, already alluded to, of modern education to educate the intelligence of the child by an appeal to the evidence of its senses, is an admirable one, seeing that it implies a natural development of mental powers. It is decidedly opposed to the parrot-like method which formerly prevailed of making children learn words by repeating them without in the slightest degree understanding their meaning. On the whole, modern education, as regards its system, may be said to be favourable to the natural mental development of the child, and assuming that such education is carried out gradually, and without any tendency to overstrain, we may safely leave in the hands of the teacher the care

of the youthful mind. This latter fact, however, does not in the least degree absolve the parent from the duty of exercising a constant supervision over the mental health of his or her offspring. It would be well, indeed, if a larger amount of attention than is now represented in the homes of the people were bestowed upon the educational progress of children.

Backwardness in Children.—Whilst certain children are undoubtedly precocious in the sense that their brain-powers develop much more quickly than those of other children, we meet with illustrations of the contrary condition, in which children show a decided backwardness in appreciating what may be termed the meaning of the simple facts of life. Cases of this "backwardness" often give much trouble to parents, and cause a vast deal of anxiety regarding the possible future development of their offspring. It is no uncommon thing, for example, to find a child backward in respect of its speech. In another case there may be represented a lethargy or slowness in forming ideas. Indeed, in respect of the phases of mental development of children, many varieties are to be observed. Undoubtedly a large number of cases of mental backwardness depend on weakly health due to erroneous upbringing, or to defective traits inherited from parents. At the same time, children born of what are termed a neurotic or nervous stock, and who are to be regarded in one sense as abnormal units, may exhibit precocity of brain powers. If mental backwardness in children is proved to be due to ill health, it is clear that every effort must be made by the parents to improve the physical state of their offspring. In the case of a child who suffers from rickets (vol. i.), for example, we find associated with that disease a tendency of slowness in mental development. Such cases are, of course, capable of marked improvement if the symptoms of the disease are early detected, and if the services of the physician be enlisted for their betterment. A general rule in all cases of mental backwardness is that which warns us against injudicious attempts to force onwards the mental development of the child. In such a case we are practically attempting the impossible feat of sowing seed in a soil incapable of germinating it. When we have improved the bodily condition of the child, thereby also affecting the health of the brain, our educational efforts are much more likely to be crowned with success.

It is notable that many children who have appeared dull and backward in their earlier years have developed into highly-cultured men and women. Indeed it may be said, following the ideas of an authority, that the average child, exhibiting by no means a large amount of mental brilliance, is more likely to grow up into a useful

member of society than the precocious child, who, long before his appointed time, develops mental traits and features which can only be regarded as utterly out of place in an individual of his years.

Imbecile Children.—The case is different of course with children who are born into the world with defective brains. Such abnormalities may range from slight brain weakness which gradually disappears as age advances, onwards to cases in which a child is born in what is termed an idiotic condition. In this last state we meet with structural deficiencies in the organ of mind. Such deficiencies are illustrated either in the over-development of the brain or in its under-development. Here, unfortunately, we come face to face with cases which are only susceptible of betterment, as a rule, up to a certain standard. Of late years vast improvements have been effected in the education of so-called *imbecile children*, only such education must be undertaken by qualified persons, and must be conducted in special institutions where all the details of training can alone be perfectly represented.

A Summary.—Summing up the whole question of the hygiene of childhood, we may therefore come to the conclusion—first, that a healthy parentage and ancestry are necessary for the development of healthy offspring; in the second place, special and particular attention to the laws of health applied, as we have shown, to the case of infancy and childhood is required; whilst, in the third place, after ensuring to the child the possession of a healthy body, its care from an educational and mental point of view also forms a highly essential part of the great scheme of health science which regards the proper upbringing of the young as the necessary foundation for the health of future generations of the people.

SECTION XI

ON INFANTILE AILMENTS

General Remarks.—The diseases that attack children are practically the same as those that are met with in adults, and the difficulty in coming to a right decision as to the nature of the complaint in a child rests not so much on the fact, often mentioned, that he cannot speak, and therefore can give no help in the way of explaining what particular form his sufferings take, but rather that the symptoms are often most misleading, trifling disorders often

being ushered in by the most alarming train of events. Such as when an overloaded state of the bowels gives rise to convulsions, or when the temperature rapidly mounts up to 104° or 105° as a result of the child having partaken of some indigestible article of diet. The object of this paper is rather to draw the attention of the reader to the causes, symptoms, and treatment of disease in general than to the consideration of special diseases which have already been treated under other sections, a few only of these latter being mentioned.

Causes.—Apart from the infectious fevers, the chief causes of illness in children are—(1) *improper feeding*, and (2) *exposure to cold*. The subject of infant feeding has been thoroughly gone into elsewhere, but it cannot be too strongly or too frequently impressed upon those who have the care of infants and children, that careful dieting is of the utmost importance at a period when the whole body is in a state of active development. Napoleon said that “an army marched upon its stomach”—so does an infant; everything depends upon the condition of the digestive system. However ill a child may be from whatever acute disease, if it can digest its food the probability is that it will recover. To the fact that young children are allowed to eat “just what’s going” is largely due the high mortality prevalent during the first five years of life. *Exposure to cold* is another cause of illness in children; their bodies are easily chilled, and consequently catarrhal affections such as bronchitis and diarrhoea are frequently met with. To avoid chills, the child should be clothed in woollen garments, and every part of the body, with the exception of the face and hands, should be protected.

The habit of “shortening” infants’ clothes when they arrive at the age of three months is fraught with the greatest risk, more especially in the winter months. Nor can this be wondered at when one remembers that suddenly, and merely at the dictate of fashion or custom, the long-clothes, “barries,” &c., are removed, and the child is put into short frocks and socks, leaving its legs bare from the middle of the thigh to far below the knee. When the shortening has to be carried out, the child should always be put into woollen combinations with sleeves, and the woollen stockings should overlap the legs of the combinations. In addition the “binder,” that great protective against chilling of the abdominal organs, should on no account be discarded until the child has arrived at the age of two years; and indeed it may be worn with advantage for a longer period if the child shows any tendency to catarrhal troubles. In applying the binder care should be taken that it is not applied so tightly as to impede the child’s breathing, a broad knitted belt like a

miniature lumbago belt being admirably suited for the purpose. The combination sleeping suit made of flannel—*not flannelette*—should always be worn, and then the risk of the child kicking off the bed-clothes and lying with its limbs bare is avoided. Children frequently contract a chill by being taken suddenly from an *overheated room* out into the fresh air, therefore the ventilation of a child's room should be carefully attended to, and he should not be exposed to sudden changes of temperature; and this can best be avoided by never having the rooms too warm, and by ensuring a plentiful supply of *fresh air*.

Symptoms.—The remark has already been passed that the *symptoms* of children's ailments are often very misleading, and we often find that symptoms which in the case of an adult are almost certain indications of some serious condition, have no significance whatever in a child. Thus the *temperature* in children is of very slight importance as an indication of the severity or otherwise of an attack, the most trifling ailments sending the mercury flying up five or six degrees; and the same remark may be made with regard to the *pulse*, which often varies with the mood in which the child is, slight causes often producing a marked increase in the pulse rate. During sleep the pulse is sometimes irregular, but this condition is of no importance as a symptom by itself.

Facial Lines.—Of much more importance than the pulse and temperature, as an indication of the cause of a child's suffering, is the *expression of its face*. A child that is seriously ill always wears a distressed, haggard look—it looks ill in fact; and so long as this expression does not appear, the probability is that the child is not really very ill. When the child suffers from headache the brows are generally puckered. The nose has often a pinched look when the disease is situated in the abdomen. Certain *lines* can sometimes be traced on the face which are an indication of the seat of the disease. Thus one starts from the side of the nose, and passing down curls round the angle of the mouth; this points to the *stomach and bowels* being the seat of the disorder. Another starts at the angle of the mouth and runs across the lower part of the face, and is an indication of some derangement of the *lungs*; whilst a third begins at the inner angle of the eye, and passes downwards and outwards below the lower eyelid to the cheek, and is a reliable indication of some *brain* trouble.

Complexion.—The *colour* of the face affords valuable hints as to the diseased condition; it is flushed in feverish attacks, pale, as a result of bloodlessness, yellow when *jaundice* is present. There is blueness and lividity round the angles of the mouth and nose whenever there

is any obstruction to the entrance of air to the lungs, as occurs in cases of diphtheritic croup. When the stomach is out of order the complexion assumes a sallow, muddy hue. In rickets the head is bathed in perspiration, and it may be well to point out here, that in all exhausting diseases of infants the soft part of the skull just above the forehead, where the bone has not yet formed, is always *depressed*; and this affords a much better indication of the weakness of the child than the pulse does.

Attitude.—Children often take up characteristic *attitudes* when ill. Thus in disease of the brain, such as tubercular meningitis, the head is drawn back between the shoulders. In rickets the child bores its head into the pillow. When suffering from colicky pains it cries and draws up its legs. A child that is seriously ill lies on its back with its face directed straight upwards, and its eyes half closed.

The Cry.—Something may be learned from the *cry* of a child; when it screams continuously and refuses to be comforted, the probability is that it is suffering from *earache*, a very common occurrence. If the fits of crying come in paroxysms, and the child draws up its legs, colic is the most likely cause. A hungry child cries constantly, and is continually bending and stretching out its arms and legs. A thirsty child—and children are often thirsty—cries, and its lips are dry. In croup the cry is *hoarse*. Sometimes a child is so ill that it *cannot cry*, or it at least can make no sound.

Breathing.—Careful attention should be paid to a child's *breathing*; it is always rapid and laboured, and the *nostrils* are continually working when there is disease of the lungs, and sometimes it is so necessary for the child to breathe rapidly, that it has no time to suck, and consequently *refuses its nourishment*. In croup the breathing, like the cough, is hoarse. In disease of the brain the breathing is *irregular*, and of a sighing character. When there is any obstruction to the entrance of air into the lungs, as in diphtheritic croup, the lower end of the breastbone is drawn in every time the child tries to draw a breath, and in rickets there is a deep depression on each side of the chest, due to the softness of the bones.

Cough.—The character of the *cough* is often a valuable guide as to the nature of a child's trouble; thus everybody is familiar with the "whoop" or "kink" that terminates a paroxysm in *whooping-cough*, and with the hard, dry, irritating cough which, along with a severe cold in the head, is the precursor of *measles*. In *bronchitis* the cough is at first hard and painful, the pain being situated behind the breastbone, but soon becomes softer; and it may be pointed out here that infants and young children never expectorate after a cough, so that no opportunity is afforded for examining the sputum. In inflammation

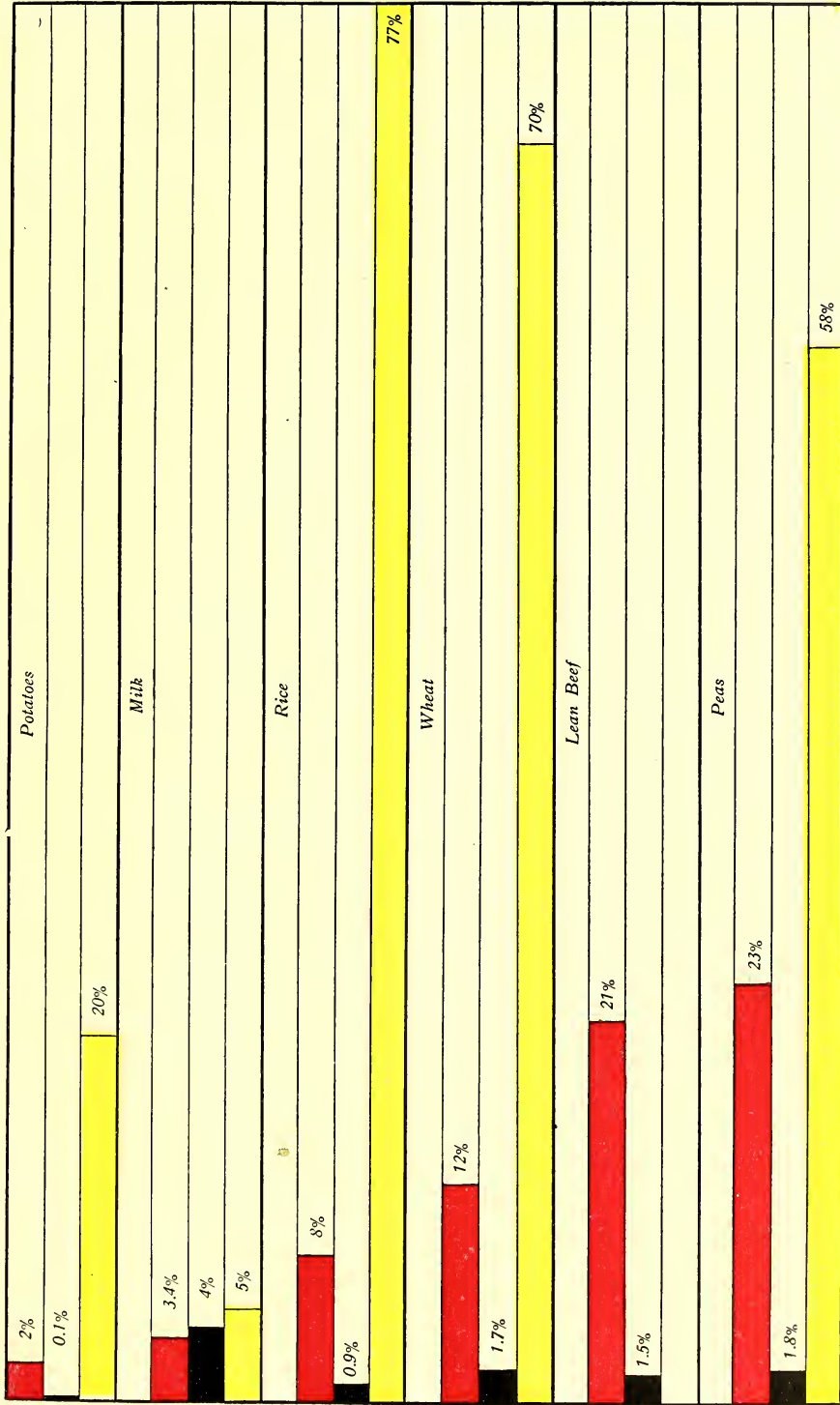
of the lungs or *pneumonia* the cough is a short, hard-hacking one, very frequent and most distressing to the little patient. In *croup* the cough is hoarse or "croupy," but it must not be forgotten that the same character is given to the cough in the disease termed *retro-pharyngeal abscess*, to be afterwards described.

Nervous System.—The *nervous system* is in a highly excitable and unstable condition, consequently there are few infantile diseases in which some nervous phenomena do not appear, and of these *convulsions* are the most frequent and the most alarming; but unless these are repeated frequently, they are not so serious as they look. Many acute diseases such as pneumonia and Bright's disease are preceded by a fit, but delicate children, and more especially those who are subject to *rickets*, may have a convulsion from very trifling causes. Of course a convulsion may be really an *epileptic fit*, but time alone can show whether or not such is the case. When the convulsion is the result of *brain disease*, the fit is repeated frequently and is followed by signs of paralysis and other nervous symptoms. Allied to convulsions which are due to irritation, are the *night terrors* from which nervous children suffer, and which are due to indigestible suppers, or the irritation caused by worms.

In the disease called *chorea* the child suffers from irregular convulsive contractions of the limbs and face. Delicate children, especially those suffering from rickets or from some chronic bowel complaint, sometimes suffer from a peculiar contraction of the fingers and toes, or of the feet and hands, termed *tetany*. Sometimes the condition makes its appearance after a convulsion.

The Bowels.—Close attention should always be paid to the condition of a child's *bowels*. A healthy infant, during the first few weeks of its life, generally passes from two to six motions daily; these are generally of a *pale yellow colour* and of the consistency of butter, they have no disagreeable odour, and give rise to no pain during their passage. As the child grows older the motions decrease in number, averaging about two a day at the age of two months. When a child is suffering from bowel troubles, the appearance of the motions is greatly altered; thus instead of being of the same colour and consistency throughout, they may contain particles of undigested *curd*, which appear as white streaks through the motion. The *colour* of the motions is greatly altered, being *green* when the child is unable to digest its food, and suffers from diarrhoea as a consequence. When a child has catarrh of the stomach and of the first portion of the intestine, he frequently shows signs of *jaundice*, and then the motions are *clay coloured*, owing to the absence of the colouring matter of bile in the intestines. When there is bleeding in the stomach, the motions

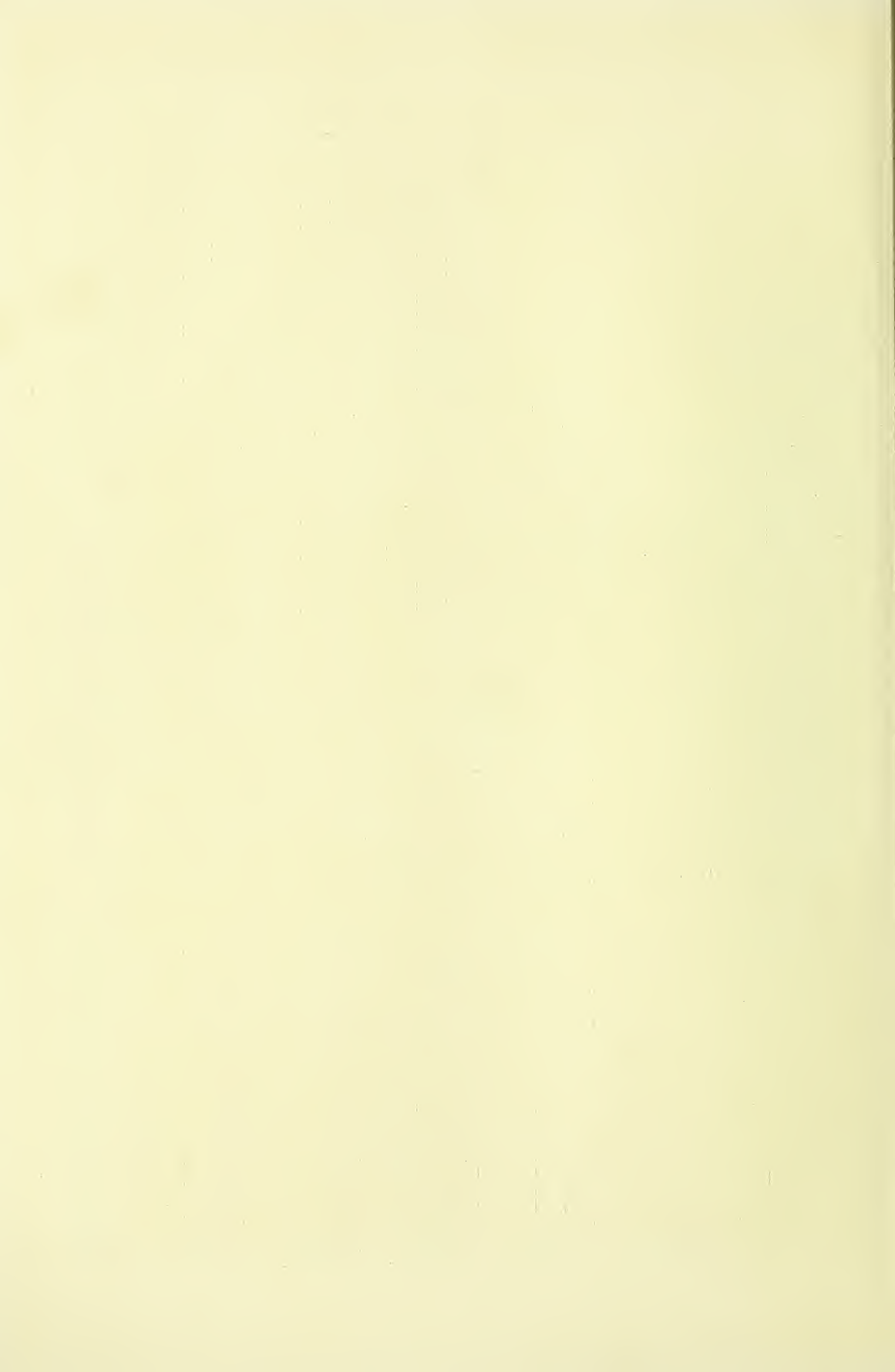
PERCENTAGE OF PROTEIDS, FATS, AND CARBO-HYDRATES IN SOME COMMON FOODS.



FAT.

PROTEID.

CARBOHYDRATE.



are *black*, due to the presence of digested blood, but the blackness may also be due to the administration of bismuth.

Diarrhœa.—When catarrh of the bowels is present, giving rise to *diarrhœa*, a child may pass from fifteen to twenty motions a day; and these are as a rule very *watery*, and, indeed, may contain no solid particles whatever, which is always cause for anxiety. Then again, when the catarrh is situated at the lower end of the bowel, the motion may consist almost entirely of pure mucus, which is voided after much straining and discomfort.

Constipation.—The condition opposite to that of *diarrhœa*, namely, *constipation* or costiveness, is one from which infants and children frequently suffer, and this may be the result either of disease or of a *bad habit*. In the case of infants, the mother's milk may give rise to constipation, or it may be the result of improper *artificial feeding*. Frequently it is due to the administration of drugs in the form of *soothing syrups*, most of which contain *opium* in one form or another. Minute *cracks* or *fissures* sometimes make their appearance at the *anus* or opening of the bowel, and as their presence gives rise to great pain during the passage of a motion, children restrain the desire to go to stool, and so contract the habit of constipation. The *effects* of constipation, apart from the general deterioration of the child's health, are frequently serious, *hernia* or *rupture* being a common sequel, whilst not infrequently one portion of the bowel is forced down into another portion, producing what is called an *intussusception*, or "slip" of the bowel, a most serious accident, which almost invariably ends in the death of the child, unless it can be quickly relieved.

Intussusception.—Intussusception generally occurs in babies who are under a year old, and the symptoms always commence very suddenly, with fits of screaming, the child twisting about in agonising pain. As a rule it *vomits* any food that may have been in its stomach. There is great *straining*, but all that passes from the bowel is some *blood-stained mucus*, the appearance of which, along with the screaming, is a certain sign of one portion of the bowel having slipped into another. The paroxysms of pain return at frequent short intervals, and nothing will lie on the child's stomach; it soon becomes pale and haggard-looking, the belly becomes tense and distended, and it passes into a state of *collapse*, in which it dies, generally on the third or fourth day after the attack.

The one point to remember in the *treatment* of such cases is that on no account should a purgative be administered by the mouth; in fact, the practice of giving a child a dose of medicine when suffering from pain is often fraught with great danger: true, the pain may be due

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to *colic* only, but even for this condition an *enema* is more efficient and acts more promptly, and in the event of the pain being due to more serious causes no harm has been done. To soothe the pain warm fomentations may be applied to the belly, and it is generally necessary to give opium in some form, the best being the subcutaneous injection of *morphia*, one-twentieth of a grain being injected under the skin every half-hour until some effect has been produced on the pain. Such a dose may be given to a child a year old. By the mouth nothing should be given but sips of iced water and teaspoonfuls of meat juice or milk. In the large majority of cases the only hope of recovery lies in the early *opening of the abdomen* by a surgeon, and statistics recently published prove that the earlier this is done the better are the results, so that little or no time should be wasted in attempting to replace the slip by other unscientific means. Reverting once more to the question of constipation, it may be well to mention that sometimes hard masses of excrementitious matter accumulate in the lower bowel, and by their irritation give rise to watery discharges, and the child is treated for diarrhoea, whilst the actual condition is one of costiveness. In conclusion it only remains to remind the reader that the belly of a healthy child is always large, that it feels soft and "puddingy" when pressed by the hand, that it moves freely during respiration, and that these movements cease whenever inflammation of the bowels is present.

Vomiting is a symptom of great importance in children's ailments. It may be the result of *careless dieting*, and then it generally follows a meal, and the vomited matter consists of sour-smelling fluid, in which float particles of undigested food; but it must be borne in mind that many of the infective fevers, more especially *scarlet fever*, is preceded by vomiting, and whenever this symptom is accompanied by a sudden *rise of temperature* the probability of the case being one or other of the fevers must not be lost sight of. Vomiting is a most important symptom in *brain trouble*, and whenever it makes its appearance at "odd times" and without any relationship to meals, when it is not preceded by *nausea*, when persistent *constipation* accompanies it, and when the child complains of *headache*, brain mischief, and more especially *tubercular meningitis*, must be feared. Obstruction or stoppage of the bowels, whether it be due to a "rupture" which has become fixed and cannot be returned into the belly, or to an internal "slip" of the bowel, is, as has already been pointed out, always attended by vomiting; but in such cases, whatever be the cause, the belly is as a rule *distended*, whilst in brain mischief it is retracted or *boat-shaped*.

The Mouth and Throat of an ailing child should always be

carefully examined. In the former we often find little *blisters* scattered over the inner side of the lips and cheeks and on the palate, constituting what is termed *stomatitis*. This affection generally accompanies stomach troubles, and the act of sucking gives rise to so much pain that an infant often refuses to take nourishment, though the large majority of cases occur amongst hand-fed babies. A somewhat similar condition, termed *thrush*, is due to the invasion of the mouth by a fungus, which gives rise to the formation of white membranous patches on the sides of the cheeks and on the throat. It usually attacks children who have been practically starved by being fed with an unsuitable artificial food, and who are in the last stages of emaciation. The *treatment* of both these varieties of inflammation in the mouth consists in close attention to the *cleanliness* of the mouth. After every meal the mouth should be washed out with warm water, and then brushed over with a solution of *borax* in glycerine. If the bowels are costive a grain of grey powder and a few grains of rhubarb should be administered. The most important indications, however, are to ensure good *ventilation* in the child's room and to investigate its dietary; as a rule such children have been getting far too much *starchy food*, which they are unable to digest.

A child's *throat* is exposed to various forms of inflammation, and should always be examined. The first symptom of *scarlet fever* is generally a sore throat, the rash not appearing till twenty-four hours after, the scarlatinal throat consisting of a general redness over the back of the throat and tonsils, with small *white patches* scattered through it. The condition of the tongue, too, is very characteristic, it being coated with a thick creamy fur. Sometimes a sore throat is the only manifestation of scarlatina, there being no rash, the *peeling* of the skin alone affording a true indication of the disease. *Diphtheria* declares itself in the throat by the appearance of a *membranous patch*, which appears on one tonsil, and may spread over the mouth and across to the other side. Occasionally the general symptoms of this disease are so insignificant that it is not until signs of *paralysis* appear, and liquids that are being drunk *return through the nostrils*, that the true nature of the disease is revealed. If a white patch, which appears on the throat, can be brushed away without causing *bleeding*, the *probability* is that the case is not one of diphtheria.

Simple Sore Throat.—Apart from the infectious fevers, however, children are very liable to sore throats produced by *chills*, and more especially is this the case amongst those who have a tendency to *rheumatic affections*. In such cases the back of the throat is red and inflamed, and little specks of white matter exude from the

mouths of the glands which are present, more especially on the tonsils. The child is feverish, and complains of great thirst, and, of course, of pain on swallowing.

The *treatment* consists in confinement to bed and the application of a *cold compress* to the throat. A dose of calomel, followed by a saline purge, should also be administered, and two or three grains of salicylate of soda may be given every three or four hours, when the sore throat is believed to be of a rheumatic character.

Quinsy, or inflammation of the *tonsils*, is another affection to which older children are subject. The disease is fully discussed in vol. ii., and it only remains to add that as the attacks are frequently repeated they often result in the permanent enlargement of the tonsils, which leads to much discomfort; and, indeed, to permanent impairment of the child's health unless they are removed by the surgeon.

Retro-pharyngeal Abscess.—Children during the first year of life sometimes suffer from the formation of an abscess or accumulation of matter at the back of the throat behind the tonsils, termed a *retro-pharyngeal abscess*. The disease generally attacks children with scrofulous tendencies, and is apt to be a sequel to the infectious fevers such as measles and scarlatina. The first symptom generally noticed is some *difficulty in breathing*, then there is *difficulty in swallowing*, and fluids are returned through the nose. The child holds its neck stiffly, and there is often a cough which is hard and dry. On examining the throat, a bulging is found at the back, which presses against the soft palate and may almost reach the tongue. The *treatment* of such a condition consists in the early opening of the abscess, and the administration of tonics such as iron and cod liver oil.

The Ear.—Diseases of the *ear* are dealt with elsewhere, but it may be well to remind the reader that persistent crying is frequently due to *earache*.

The Urine.—The examination of the *urine* is always essential in children's ailments, but samples are very difficult to obtain in the case of infants. In health the urine is clear, of a pale yellow colour, and of low specific gravity. The amount is very variable, as very slight causes influence the secretion in children. In feverish attacks the urine is diminished in quantity, and is dark in colour. *Albumen* is frequently found in the urine of children, and is of especial importance in the later stages of *scarlatina*, when there is always a risk of *inflammation of the kidneys* supervening. In *diphtheria* albumen is as a rule present. *Blood* may be present in the urine of a child, and in the case of boys is very frequently due to the presence of a *stone* in the bladder; in such cases the act of passing water is painful, the stream sometimes stops suddenly, and the

blood appears at the end of the act. Children frequently suffer from *retention of urine*, and in the case of boys this is often due to the presence of a long foreskin with a very narrow opening. The presence of *worms* in the lower bowel sometimes leads to retention, and so does the presence of hard masses in the bowel; for these conditions a hot water enema is advisable, as it removes the irritation and thus relieves the spasm.

Incontinence of Urine.—More common than retention is the opposite condition of *incontinence of urine*, in which the child is unable to retain the urine and consequently *wets the bed*. This is a most troublesome affection, and often most difficult to cure, though as a rule it disappears when the child arrives at the age of puberty. The condition may arise from bad habit or laziness, but it is very often due to the irritation produced by a long foreskin, or to the presence of worms in the intestine, or to the urine being over acid, so that these possible causes should always be investigated. In *treatment* harshness should never be resorted to; no amount of punishment will ever cure a child of wetting the bed. As the accident usually happens when the child is lying on his back, it is a good plan to fix a reel or some other similar article to the small of the back, so that it becomes uncomfortable to be in that position, and the child has perforce to lie on his side. The child should be lifted two or three times during the night, and more especially towards the *early morning*. His *diet* should be simple, and some think that abstinence from animal food and soups affects a cure when everything else fails. Of medicines *tincture of iron* is undoubtedly the best, and should be given with an equal quantity of glycerine, ten drops of each three times a day after food. *Belladonna* is another drug in which many have faith. It has to be given in fairly large doses, as children take it very well; and to a child of five years of age fifteen drops of the tincture may be given three times a day, and the dose increased by two drops every second day till the pupils are dilated and the throat feels dry. Electricity in the form of the continuous current has also proved successful in many cases.

Treatment.—Having discussed the *causes* and *symptoms* of infantile ailments in general it remains to give a few hints regarding their *treatment*, and this to be successful must always be carried out on certain definite lines. The most important indication for an ailing child is that it should have *rest*, and this it can only obtain by being *put to bed*. Whenever a child shows a disinclination for play—when it sits or lies about the room, and tries to be as near the fire as possible; when it refuses its food, and loses the alert fresh look of health, or whenever its temperature rises to 100° F. bed is the best

place for it. Many a serious illness would be avoided, or at least its severity greatly diminished, were this the rule of every household. Of equal importance is the rule that the sick-room should be capable of being properly *ventilated*, that it should be the *sunniest* and the *quietest* room in the house, and that it should be kept at an equable *temperature* during the whole course of the illness, 65° F. being the most comfortable. Thirdly, the diet of a sick child should always be of the simplest description, milk, animal broths and jellies forming the staple articles; whilst it must never be forgotten that children frequently suffer from *thirst*, and that some bland decoction such as barley water, or toast water, agreeably flavoured, or home-made lemonade should always be provided, and these given in small quantities when asked for. Occasionally it happens that a child either refuses to take nourishment, or is unable to do so, the latter being the case in the paralysis which follows diphtheria, when the food is returned through the nostrils. In such cases a simple way out of the difficulty is to have a glass syringe fitted with a short piece of india-rubber tubing, and having filled the syringe with the liquid to be administered, to pass the tube between the teeth to the back of the tongue, and to slowly empty the contents of the syringe into the back of the throat, when the child has perforce to swallow. When this plan fails, it becomes necessary to pass the rubber tube through one of the *nostrils* to the back of the throat, and so administer the nourishment.

Drugs for Children.—In the treatment of children's complaints, *drugs* should take a very secondary place indeed. It seems to be a standing rule in every household where there are children that a *purgative* is a panacea for every ailment, and this has frequently led to disastrous results, many a child suffering from serious bowel trouble having been done to death by injudicious attempts at purgation. Far better and far safer as an initial step in the treatment of any case is the administration of a *warm bath*; this allays the nervous excitement, reduces the temperature, and induces a refreshing sleep, from which the child awakens refreshed and probably much better. Much may be done in the way of regulating the action of the bowels by diet; and in many cases of stomach trouble *starvation* for twenty-four hours acts like a charm. Frequently it happens that a child suffering from diarrhoea is being fed on milk, and that the looseness continues in spite of the administration of medicines to control it. If in such cases the milk be entirely discontinued, and the child be put on chicken or veal tea for a day, the diarrhoea disappears without the use of any drug whatever. In applying *external applications*, such as poultices and hot fomentations, the greatest care must be

taken to avoid injuring the *skin*, which is very delicate. A mother should be able to hold a warm poultice against her cheek for at least a minute without discomfort before she applies it to her child. Mustard plasters and blisters should never be applied to a young child. Only the simplest of drugs should be administered to children. *Opium*, though most useful when administered with caution, is most dangerous, as children are more susceptible to its effects than are adults. As regards *sedatives*, *bromide of ammonium* is a safe drug which may be given to allay restlessness and induce sleep, five grains being a suitable dose for a child twelve months old. *Alcohol* is of the greatest service in the treatment of children's complaints, when these are accompanied by great weakness. Small doses of brandy, from fifteen drops up to a teaspoonful according to the age of the child, given at intervals, often enables a child to pass safely through a critical period; whilst a little port wine, diluted with an equal quantity of water, given at meal-times, often greatly improves the digestion. *Tonics* are greatly in demand whenever a child seems run down and out of sorts; but a tonic can only restore tone to the system after the ailment which caused the depression has been removed, and therefore their indiscriminate use is to be avoided. But small doses of the tincture of *nux vomica*, 1 to 3 drops, with 4 to 5 grains of bicarbonate of soda, sweetened with a few drops of glycerine and diluted with water, given three times a day before meals, often improves the digestive powers where gastric catarrh is present; and the various preparations of *malt* and iron which are to be obtained may be recommended as tonics after recovery from acute diseases, the malt being less apt to set up acidity in the stomach than are the older preparations made with syrup.

Teething Troubles.—Between the sixth and eighth month of its life an infant begins to cut its *milk teeth*, and to the process of dentition is attributed all the ailments with which the child is afflicted during the next eighteen months. But whilst the appearance of the teeth is the only visible sign of development, it must never be forgotten that this is only one of a series of changes that are taking place in the body; thus when the teeth begin to make their appearance, the child begins to *dribble* at the mouth, indicating development of the salivary glands in the mouth. At the same time the glands throughout the digestive tract begin to show signs of activity, and, as is well known, though frequently disregarded, a child can digest *starchy food* only after it has begun to cut its teeth. Moreover, the *brain* and nervous system are also undergoing rapid changes; in fact, all the organs of the body act as the plants do in spring, and start into life, so that whilst it is an undoubted fact that teething exposes a child to many risks and is a trying period to many chil-

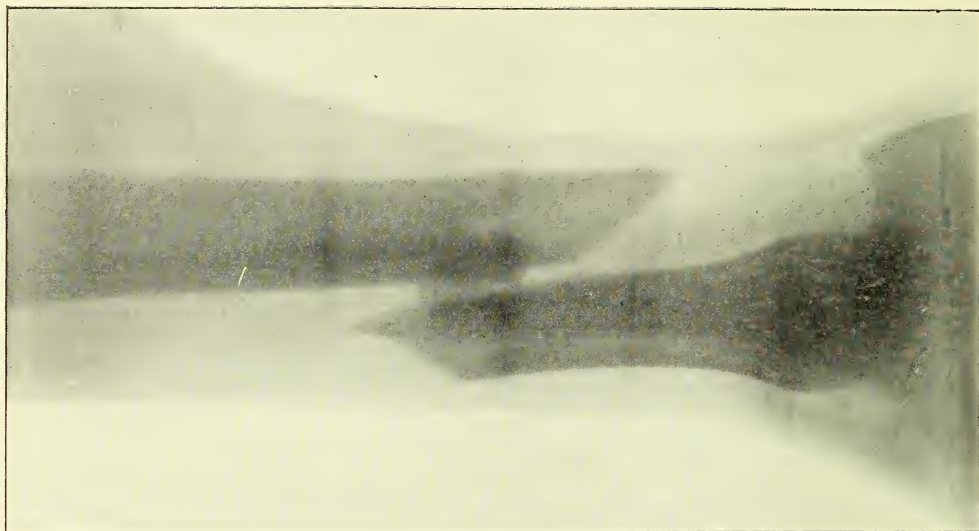
dren this risk must not be indiscriminately attributed to the teeth alone, but the fact borne in mind that in other regions than the mouth may lie the cause of the trouble, because every region of the body is passing through the same stage of activity and development. The chief cause of trouble during the teething period is the *feverishness* which is almost invariably present during this time, and which renders the child susceptible to *chills*, the temperature in many cases being as high as 103° or 104° F.; the chill giving rise to *catarrh* of the *stomach*, producing indigestion, or of the *bowels*, causing diarrhoea, or of the *bronchial tubes*, causing bronchitis, all of which troubles are common during the time that the teeth are being cut. And whilst these remarks refer especially to the cutting of the *milk teeth*, somewhat similar derangements are apt to appear during the *second dentition*, though of course the child is then much older, and more able to battle against its ailments.

The milk teeth generally make their appearance in a regular and fixed order, the two centre teeth in the *lower gum* appearing between the sixth and eighth months, then the two centre teeth in the *upper gum* between the eighth and tenth months, followed very soon by a tooth on each side of the central ones in the upper gum, and these followed by the eruption of the two corresponding teeth in the lower gum, so that at the end of its first year a child has eight teeth cut. By the fourteenth month he should have cut his first four big teeth or *molars*, and between the sixteenth and twentieth months his eye-teeth or *canines*, whilst by the end of the second year or early in the third year, the second set of four back teeth or molars should have made their appearance, and the full number of milk teeth—*twenty*—be completed. The teeth, it may be remarked, generally make their appearance in pairs. The milk teeth generally drop out in the same order in which they make their appearance, but the first *permanent* teeth to make their appearance are the *molars* in the lower jaw, followed by those in the upper, the second dentition beginning in this order at about the *sixth year*. The two central biting teeth appear at the *seventh year*, and the lateral ones at the *eighth*. The first *bicuspid*s, which are not represented amongst the milk teeth, but take the place of the temporary molars, appear at the *tenth year*, and the second bicuspid at the *eleventh*. The *eye teeth* appear between the twelfth and thirteenth years, the *second molars* between the thirteenth and fifteenth years, and the four *wisdom* teeth about the twenty-first year.

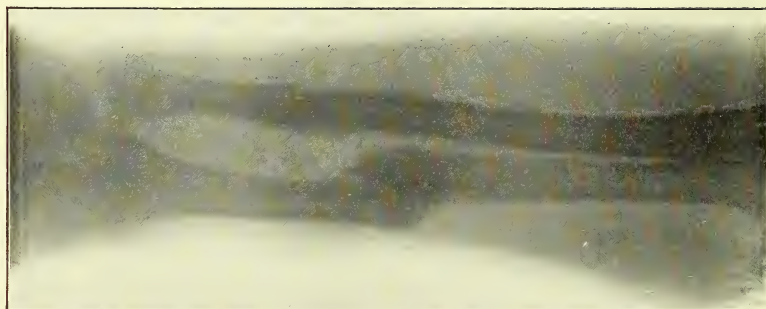
Whilst the above is the order in which the teeth appear, variations both in time and order are frequently met with. Thus children may begin to cut their teeth at a much earlier period than the sixth



FRACTURED AND SET BONE AS SEEN BY THE
RÖNTGEN RAY APPARATUS



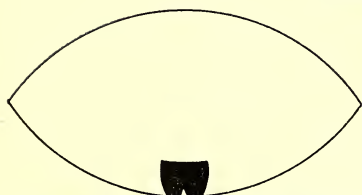
A FRACTURE.



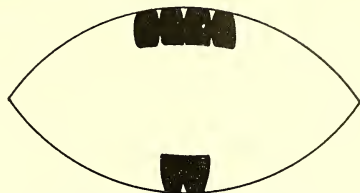
A FRACTURE SET.

ORDER OF CUTTING THE TEMPORARY AND PERMANENT TEETH

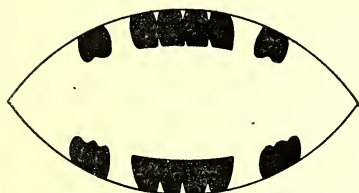
TEMPORARY TEETH



6-9 months, Lower Central Incisors.



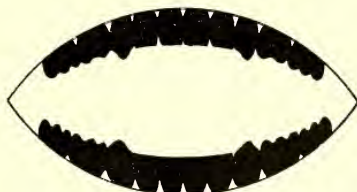
8-10 months, Upper Incisors.



15-21 months, Lower Lateral Incisors
and First Molars.

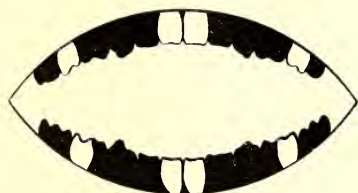


16-20 months, Canines.



20-24 months, Second Molars.

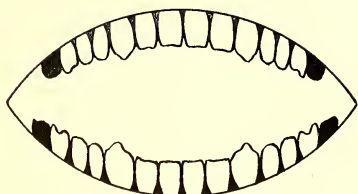
PERMANENT TEETH



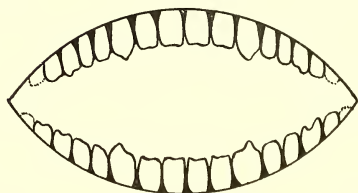
6-7 year, First Molars and Two
Central Incisors.



8-9 year, Two Lateral Incisors and
First Bicuspid.



10-12 year, Second Bicuspid and
Canine.



{ 12-13 year, Second Molars.
{ 17-25 year, Wisdom Teeth.



Treatment of Teething Troubles 201

month; some children are born with a tooth already cut, at other times the dentition is greatly delayed, and this is especially the case in *rickety* children, in whom no tooth appears until they are two or three years of age. Then, again, the *order* in which the teeth appear may be irregular, a child cutting its upper incisors or biting teeth before its lower ones. The teeth, more especially the *permanent* ones, often grow in a wrong direction, and give rise to deformity of the mouth.

Symptoms.—As has already been remarked, during the first two years of an infant's life every conceivable ailment is attributed to teething; but as a matter of fact teething is a natural process, and in many cases, especially those of children who are *reared at the mother's breast*, no symptoms arise, hand-fed babies being much more frequently troubled. At the same time it must be admitted that, even under the most favourable circumstances, some children do suffer from symptoms which may be traced directly to the eruption of teeth. Thus a child becomes restless and irritable, he starts in his sleep, his temperature rises sometimes to 104° F., he is continually making munching movements with his jaws, and his gums are swollen and tender, all of which symptoms disappear as soon as a tooth comes through. But these symptoms are to be placed in quite a separate category from the *diarrhæa*, which really arises from improper feeding, but is wrongly attributed to teething, or the *thrush* which arises in the child's mouth from the use of dirty feeding-bottles, or insufficient ventilation of his room, or the sucking of dirty indiarubber rings or teats, but is attributed to the same cause. Nor, again, must the mother rest content with "teething" as the explanation of fits of crying, which are really due to inflammation of the ear and earache; and most certainly must she not rest content to allow a discharge from an ear to flow on untreated simply because it occurs during the teething time.

Treatment.—Not a single one of the diseases, such as diarrhœa, bronchitis, inflammation of the ears, eczema, convulsions, &c., has anything to do with teething. Each and all of them can be traced to quite independent causes if the trouble be taken to trace them, and each and all of them may be avoided if attention is paid to the child's *diet*, to its personal *cleanliness*, to the *ventilation* of its room, to protecting it from *chills*, and to the proper action of its bowels, skin, and kidneys. A little *lemon juice* rubbed on to the gums quickly allays the irritation. A warm bath and a small dose of *castor oil* reduces the feverishness, but *lancing the gums* is a barbarous, unscientific proceeding, which inflicts unnecessary pain, and is followed by no good result, and should on no account be resorted to. The

other so-called symptoms, such as diarrhoea, bronchitis, &c., must be treated on the lines laid down under their several heads, and to be found in other sections of these volumes.

Infantile Atrophy or Wasting.—This is a condition—often referred to as “dwining” in Scotland—in which an infant slowly wastes, and eventually dies from starvation, the starvation being due not, in most cases, to insufficiency of food, but to *unsuitable* food. It is most frequently met with amongst *hand-fed* babies, as might be expected, though not infrequently a mother’s milk is too poor to afford sufficient nourishment to the child, and if its use be persisted in the infant wastes, but never to the same extent or so rapidly as when artificial feeding is resorted to. When the mother’s milk is very poor, the child remains thin, does not seem to grow, the open spaces above the forehead are depressed, indicating weakness, it needs to be fed very frequently, and an almost certain sign of the poorness of the milk is the fact that the child almost invariably falls asleep whilst sucking. The extreme examples of wasting, however, are found amongst children who are brought up on *starchy foods*, such as arrowroot, cornflour, and the various infant foods on the market, and also amongst those who are reared on *cow’s milk* in an improper manner. Such children lose flesh almost from the hour of their birth; they are pale, the skin is dry and loses its elasticity, the lips are livid, and the feet and hands cold. They are always ravenously hungry, and not infrequently have fits of *vomiting* after meals. The bowels are *constipated*, and the motions consist of numerous small hard round masses covered with mucus. Attacks of *diarrhœa* occur frequently. The child suffers from *gripping pains*, which makes it scream and twist about in bed. This pain may be relieved by a dose of castor oil, but it returns again in a very short time, so that the child is always cross and restless and sleepless. The wasting progresses steadily, till eventually the child passes into a condition of *coma* and dies. The *cause* of this state of affairs is that, in the case of *starchy foods*, the child is unable to digest them, because he does not possess the necessary apparatus; his glands have not yet developed, and consequently the starchy food not only does not supply the necessary nourishment, but it further acts as an *irritant*, which, in passing through the stomach and bowels, sets up a *catarrh*, which gives rise to *acid dyspepsia* and vomiting, and to the alternating diarrhoea and constipation which are so characteristic. When a child that is fed on *cow’s milk* wastes, the probability is that the food is not properly prepared. Cow’s milk not only contains more *curd* than human milk, but the curd forms in hard close masses, unlike the curd of human milk, which is loose and flocculent, and it is the hard, firm

clotted curd of cow's milk which is so indigestible and which gives rise to trouble. Furthermore, cow's milk becomes easily tainted, so that if it be the least little bit stale it turns *acid*, and this further adds to the child's troubles. The subject of infant-feeding and hygiene has been dealt with elsewhere; it is therefore not necessary to enter fully into it here, it being sufficient to remind the reader that mother's milk is the only perfect food for an infant, that where it is impossible to supply it with this, *cow's milk* is the next best, but that, to be digestible, means must be taken to ensure that the curd, when it forms in the stomach, shall not be firm and hard, and this can best be done by *diluting* the milk, not with plain water, which is useless, but with thin *barley water*, equal parts of milk and barley water, with the addition of a small teaspoonful of sugar of milk to each bottle, as a rule agreeing well with a child from six to eight weeks old. Barley water does better than *lime water*, though the latter may also be used when some acidity and diarrhoea are already present: equal parts of milk, plain boiled water, and lime water making a very good mixture. *Condensed milk* does very well as a *temporary measure*, and may be given to an infant for the first four or five weeks of its life, but on no account must its use be prolonged, as, in spite of the fact that the child appears to be thriving, in all probability it will develop *scurvy rickets* before it is many months old. Sometimes it is found that, in spite of every precaution, a child seems unable to digest cow's milk, the curd appearing in the motions as undigested masses. In such cases the milk should be entirely cut off for a day, and the child fed on chicken or veal tea mixed with barley water. As regards *starchy foods*, no child should be fed on them till after it is six months of age, and then only in small quantities. Whatever food is used, its effect should be watched, and an alteration made in the proportions so soon as signs of indigestion, such as vomiting or diarrhoea, make their appearance. Strict attention to the cleanliness of the bottles and to the absolute purity and freshness of the milk is of the utmost importance. An attack of diarrhoea is an apparently trifling ailment at the beginning, but unless warning be taken it may be the beginning of a wasting which endangers the child's life.

Convulsions in Infancy.—Children, especially during the first two years of life, are specially liable to convulsive attacks; indeed the large majority of children who die during the first month exhibit convulsions as a symptom of their illness. During the dentition period, namely, from six months to two years, convulsions also frequently complicate other illnesses, though the mere cutting of a tooth is very rarely the sole cause of a fit. Male children are more liable

to attacks than are females, and those that are the subjects of *rickets* are specially subject to fits. The *causes* of fits in children are manifold; thus they may be due to *irritation* situated in the *digestive system*, such as that produced by *constipation*, more especially when the contents of the bowels consist of hard masses of undigested food, or to the irritation due to the presence of *intestinal worms*, or of undigested food in the stomach, and lastly the irritation may be due to an inflamed and painful *ear*. Then, again, a fit may usher in some acute disease such as pneumonia or Bright's disease, or some of the infectious fevers such as measles or scarlatina. Rickety children are especially liable irrespective of the presence of some acute disease. Convulsions often occur during the course of measles, scarlatina, and whooping-cough, and these are of the gravest significance, much more so than are the initial fits in the same diseases. They may be a symptom of *brain disease*, and are then frequently repeated, whereas when they are due to irritation they seldom recur if the cause of irritation be removed. Convulsions are often the result of an injury to the head, and when they occur in an infant shortly after birth generally indicate bleeding inside the skull, the result of a difficult labour, or of the use of instruments. Lastly, convulsions may be *epileptic* in origin, and time alone can show whether or not this is the case. It may comfort the reader, however, to know that the large majority of cases occurring during the dentition period are the result of *digestive irritation*, and that the fits do not recur if their cause be removed. It is often very difficult to decide on the spot to what cause the fit may be attributed, but as a general rule it may be taken that if the child is well nourished and has enjoyed good health, the probability is that the fit is due to some *irritation* which can be removed, that if high fever accompanies the fit some acute disease such as pneumonia or one of the infectious fevers may be expected to develop, and that if the convulsion is confined to *one side of the body* some brain trouble is to be feared.

Symptoms.—A child that is about to take a fit is usually restless for some time preceding the actual attack; it is apt to grind its teeth in its sleep, and to display twitchings of the muscles of its face, more especially of the mouth. The actual fit is ushered in by a loud cry, immediately following which the child loses consciousness, and his body and limbs are thrown into a condition of rigid spasm. During this stage the eyes are fixed and turned upwards so that only the whites can be seen. The face, pale at first, becomes livid, and the breathing stops. Following this stage of *tonic spasm* comes that of irregular movements, during which the face is contorted, the eyes roll about in every direction, froth gathers on the lips, the arms and legs

are thrown about, and the trunk itself is in a state of constant movement. Gradually the movements cease, and the patient passes into the third stage, that of *stupor*, in which he lies for a longer or shorter period according to the severity of the fit. Occasionally the fits follow each other in rapid succession, and the patient may die from *exhaustion* or from *suffocation*.

Treatment.—The treatment of general convulsions depends to some extent on the causes, but as one cannot as a rule put off much time inquiring into these, the usual plan of placing the little patient in a *warm* bath may at once be resorted to as a preliminary measure, and if fever is high a cold sponge may at the same time be applied to the head. As very many cases are due to the presence of irritating masses in the lower bowel an *enema*, consisting of half a pint of warm soap and water, should be administered, and repeated if it is thought that some of the hard lumps have been left in the bowel. Should it have been ascertained that the child had recently partaken of some indigestible food *vomiting* should be induced, either by tickling the back of the throat with a feather, or the finger, or by administering teaspoonful doses of ipecacuanha wine in warm water every ten minutes till the desired result is obtained. *Medicinally* sedatives in the form of bromide of potassium and chloral should be administered, five grains of bromide and two grains of chloral in a tablespoonful of water being given every fifteen minutes for four or five doses to a child a year old. Should the child be unable to swallow, ten grains of chloral may be dissolved in an ounce and a half of warm water, and the solution administered as an *enema*. Inhalations of chloroform very quickly arrest a fit, but this drug should be used with great caution and only by an experienced person. The bromide and chloral mixture mentioned above should be administered twice or three times a day for a few days to ward off a return.

Child Crowing.—There is a variety of localised convulsion termed *child crowing* or *inward fits*, which is characterised by a sudden *spasm* of the *glottis*, which threatens to instantly suffocate a child, the actual spasm being preceded by a loud crowing sound resembling somewhat the “kink” of whooping-cough, which is produced by the child drawing in a breath just before the spasm occurs. The attacks generally come on *at night*, the child waking suddenly, emitting the strange sound and then being thrown into a condition in which death seems imminent. Breathing of course is completely arrested—the face becomes livid—the eyes seem to be starting out of the head, and the fingers are clenched, the attack having all the appearance in fact of the first stage of a *convulsion*. After a few seconds the spasm of the glottis relaxes, the child gives vent to another

crow, and then bursts into a fit of crying. Whilst such attacks usually occur without warning at night, they not infrequently follow a fit of crying or an outburst of temper. Children who are the subjects of *rickets* are more liable to attacks than are others, and they are liable to return on successive nights for a considerable period. The affection is not as dangerous as some have supposed it to be, but many deaths have occurred.

Treatment.—The treatment is somewhat similar to that of general convulsions. A hot sponge should be applied to the throat, and strong smelling salts may be applied to the nostrils to induce the child to draw in a breath. Dashing cold water on the chest and face has the same effect. The child should be made to sit upright, as this renders breathing easier. If suffocation seems imminent, the finger should be passed into the mouth and the child's tongue drawn well forward. For some time after an attack the bromide and chloral mixture already mentioned should be administered three times a day, and as the child is probably suffering from *rickets*, attention should be paid to the diet.

Constipation is a trouble to which children at all ages are subject, but during infancy those who are reared on *farinaceous foods* are more particularly liable to suffer. Insufficient clothing and consequent *chilling* of the surface of the body is another fruitful source of the condition, whilst in older children want of sufficient *exercise* in the open air, and the *bad habit* of restraining the desire to go to stool, are frequent causes. It must not be forgotten too that certain *drugs* produce constipation, and that most of the *soothing syrups* administered to infants for colicky pains, which are produced by constipation, help to intensify the abnormal state of affairs. A constipated baby is always fretful and restless, its sleep is broken, its belly is distended with flatulence, it is given to occasional fits of *vomiting*, its hands and feet are always cold, and its complexion is sallow and unhealthy looking. Older children often complain of headaches, their breath has an unpleasant odour, and they are languid and listless.

Treatment.—The treatment of constipation includes the management of the child's general health, and the relief of the immediate symptoms. Careful attention must be paid to the food of the infant, and an alteration made in the dietary, starchy foods being discontinued, and care being taken that the curd of the milk is rendered less indigestible by the addition of barley water. Massage to the abdomen helps greatly, the warmed hand being passed upwards on the right side, across and downwards on the left side of the belly, the movement encouraging the passage of the contents of the large bowel. Older children should be warned of the dangers attached to neglecting

their bowels, and should be got into the habit of inducing an action every day *at the same hour*, preferably after breakfast. They should be encouraged to eat fresh vegetables and fruit, and to take oatmeal porridge for breakfast. - For the immediate relief of constipation, in the case of infants a small suppository made of yellow soap, about the thickness of the little finger, introduced into the bowel quickly induces an action, or an *enema* consisting of half a pint of warm soap and water may be injected, but this latter plan should only be resorted to occasionally, as its habitual employment leads to permanent dilatation of the lower bowel. *Medicines* should be administered with the object of restoring the *tone* of the bowel, and for this purpose the following mixture suggested by Dr. Eustace Smith may be recommended: Tincture of nux vomica, half a drop; tincture of belladonna, ten drops; infusion of senna, twenty drops; and infusion of calumba up to one teaspoonful. This dose to be given three times a day before food, to begin with, but reduced to twice a day and then to once a day as the condition improves. Strong purgatives such as castor oil, &c., are to be avoided as far as possible. For older children a dose of Apenta water at bedtime or early in the morning, or an occasional dose of liquorice powder may be administered, but attention to diet and training are of more importance.

Diarrhœa.—This is a symptom from which children during the first two years of life frequently suffer, and here again it is the *hand-fed* babies who are most frequently affected. The attacks vary in severity, but even the mildest should not be neglected, as there is always the possibility of a mild attack passing rapidly into a severe one.

Symptoms.—In the ordinary simple diarrhœa a child suffers from griping pains, which are quickly followed by a profuse watery discharge containing lumps of undigested food, the number of evacuations varying according to the severity of the attack. The child loses its colour and begins to look ill. For such an attack the *diet* must be inquired into, and any changes that suggest themselves made immediately. As the diarrhœa is most probably due to the presence of irritating materials in the bowels, a teaspoonful of castor oil may be administered, or, if preferred, a dose of rhubarb and soda, five grains of each. Should the diarrhœa continue after the initial purgative dose, five to ten grains of bismuth suspended in a teaspoonful of chalk mixture may be given three or four times a day.

Not infrequently the simple diarrhœa which is generally checked by a dose of castor oil passes into a much more severe form, which is accompanied by a rise in the temperature, and in which the motions are more frequent—five to twenty in the twenty-four hours—and

are watery, of a brown colour, and very offensive. The discharge is of an irritating character, and consequently there is redness round the child's buttocks. The child rapidly grows thinner, his pulse becomes rapid and feeble, the breathing is quick, and he may pass into a state of collapse, in which he dies, the temperature often rising as high as 106° F. towards the end. In the *treatment* of such cases we have to bear in mind the tendency to dangerous weakness and *collapse*, and consequently close watch should be kept on the pulse, and whenever it begins to grow very rapid *stimulants* must be administered; white wine whey being given frequently in dessert-spoonful doses, or a dessert-spoonful of brandy may be whipped up with the white of an egg, and a teaspoonful of the mixture given to the child every hour or even oftener. The *diet* should consist of chicken tea or jelly, or whey and barley water. Warm poultices should be applied to the abdomen, and if the temperature persistently rises the child's body should be sponged with tepid water and then quickly dried, or he should be put into a tepid bath for a few minutes. *Medicinally*, a dose of castor oil may be given at the outset, and then the following mixture: Tincture of opium, half a drop; dilute nitric acid, two drops; tincture of ginger, two drops; and water up to a teaspoonful three times a day to an infant six months old: or three grains of salicylate of bismuth in a teaspoonful of chalk mixture may be given every four hours to a child of the same age.

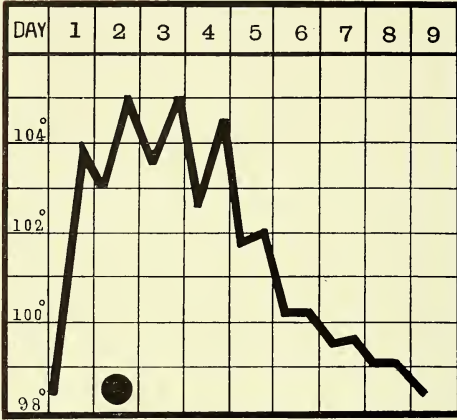
Infantile Cholera.—This is an even more dangerous complaint than the above, which occurs during the warm weather, especially during the months of July, August, and September. It begins suddenly with uncontrollable *vomiting* and *diarrhœa*. Absolutely nothing will lie on the stomach, and the discharge from the bowels consists of enormous quantities of colourless fluid. A result of the rapid extraction of fluid from the body is that the patient complains of intense *thirst*. The pulse is rapid, the temperature is high, and in a few hours the child looks as if he were shrivelled up, and he soon passes into a state of collapse and dies. *Treatment* to be effectual in this complaint must be prompt, and *stimulation* to keep up the child's strength is of the utmost importance. The patient's thirst must be assuaged, and this can best be done by giving him *iced water* to drink. Warm applications must be made to the stomach and bowels. If signs of collapse appear, the child must be placed in a tepid bath. For the vomiting one-twelfth of a grain of calomel may be given every half-hour. The opium mixture already mentioned may also be given, whilst white wine whey and the brandy and egg mixture must form the articles of diet.



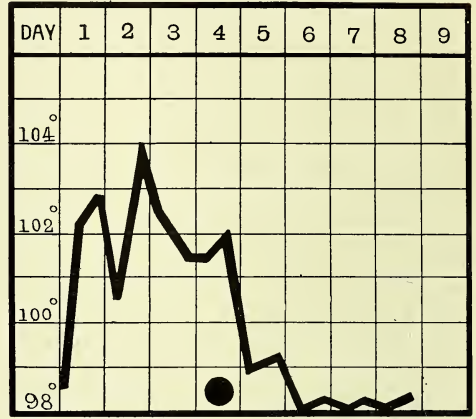
SOME TYPICAL TEMPERATURE CHARTS

The black spot shows the time of appearance of the eruption.

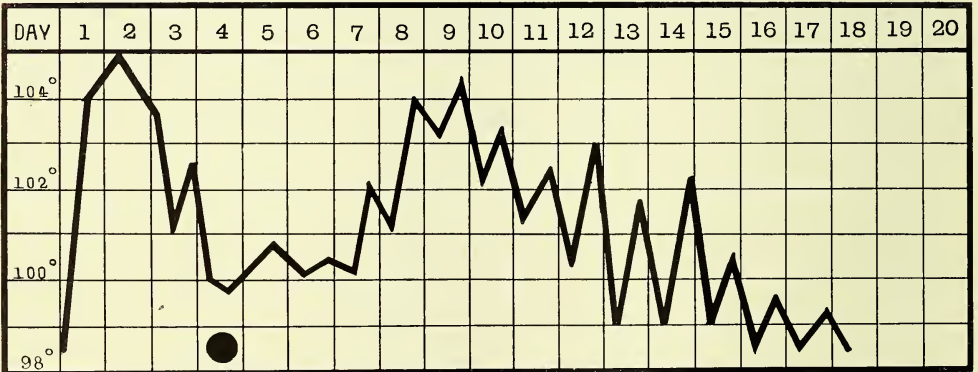
SCARLATINA.



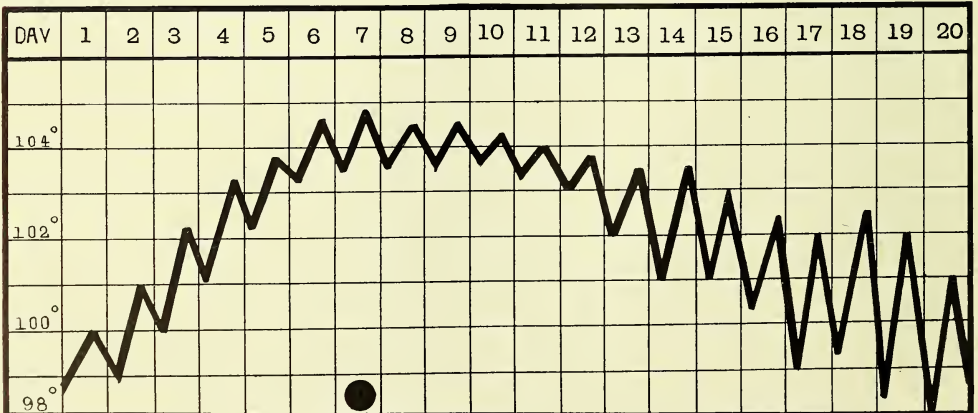
MEASLES.



SMALL-POX.



TYPHOID FEVER.



THE OPEN AIR CURE FOR CONSUMPTION

By kind permission of R. W. PHILIP, Esq., M.D., Honorary Physician of the Victoria Hospital for Consumption, Craigleith, Edinburgh.





SECTION XII

BEAUTY, THE TOILET, AND HEALTH

What is Beauty?—It might seem somewhat hard to discover a suitable definition of the term “beauty,” seeing that so many standards by which beauty itself may be judged undoubtedly exist. It might be probably a much more satisfactory mode of arriving at some notion regarding the exact nature of the term in question if we adopted the plan of inquiring the meaning of the term “fashion.” This latter term might legitimately enough be defined as human striving after the beautiful. It may, of course, be held to be extremely true that in many cases such striving and aspiration do not end in any very distinct or agreeable results, and we have therefore to bear in mind that the standard of beauty varies extremely in different races of mankind. Yet it is undeniable when we dive into human history that as far back as savage life, which in its way represents primitive mankind to-day, we find such a striving as has been indicated to be represented. There can be little doubt that, when we find an Australian native splitting his nose with a bone ornament, or a Boto-cudo Indian wearing a lip ornament, frequently weighing a quarter of a pound, and dragging down and everting the lower lip, we are face to face with savage notions of beauty. In the same way, while the Loobah woman, as represented in that great work, “The Heart of Africa,” pulls forward upon a plate the upper lip, and pierces the lower lip with a conical piece of quartz or bone, thus presenting to our ordinary civilised ideas a picture of absolute hideousness, she is nevertheless conforming to the general human striving after an ideal of beauty. All throughout savage life, indeed, we find that decorations, such as daubing the body with paint, wearing feathers, or adopting the garments peculiar to the wearer’s rank, indicate the same striving after the ideal. The wearing of earrings, of course, can be traced back to very ancient times, so that the modern woman who adopts this fashion is not merely repeating a very ancient custom of her sex, but in all probability is exemplifying a sign which originally began as a kind of act of sacrifice and as the distinctive mark of a particular tribe. References to earrings in the Old Testament seem fully to justify this latter opinion.

The Origin of Fashion.—In all probability most fashions consisting very largely of displays of colour, represent a reflection from

lower life. The plant world is gorgeous enough in its array of colour, and botanists have made clear that such a display of coloration in flowers is an aid to the fertilisation of plants through the attraction of insects by the bright hues. In the case of many lower animals colours are developed, either as warnings or as protection against enemies. In higher animals, such as in birds and quadrupeds, it is notable that as a rule it is the males alone which are brightly coloured. The comparison of the gorgeous peacock with his somewhat dowdy mate the peahen, forms an apt illustration of a rule extremely common in bird life at large. In the same way we find amongst quadrupeds such an animal as the lion exemplifying the special characteristics we tacitly associate with the word leonine, the male lion thus appearing a majestic creature by the side of his lesser-sized and less splendidly decorated mate. The savage illustrates very much the same rule that the decorative art is typically exercised by the males. In civilised life, on the other hand, where woman has been elevated to the rank of her mate, and where she no longer represents the beast of burden and degraded creature too often led in savage life, she has come naturally, and through, we may say, the chivalry of her mate, to represent the typical exponent of beauty. It may thus be contended on social grounds that the fact of woman's dress exhibiting to-day many and specific differences from that of man, and chiefly in the direction of coloration, represents practically a testimony to the evolution which her sex has undergone at the hands of civilisation and to the high and equal place she now occupies with the males of her race.

Beauty and Health.—It is hardly necessary to reiterate that the standard of beauty amongst civilised nations varies exceedingly. It might therefore be thought difficult to frame some general idea whereby the relations of beauty and health should be determined in a manner satisfactory to the sanitarian. The difficulty, however, is more apparent than real. There can be no phase of hygiene more clearly perceptible than that which asserts that whatever fashions be adopted by woman (or by man himself for that matter), the one test to be applied to them in relation to bodily welfare is that of inquiring if they are consistent with health. Thus tight-lacing—a topic which has already been referred to in this work—compressing the lower part of the chest, displacing the liver and other organs, and limiting the capacity of the lungs, must be regarded, however fashionable it may appear to be, from a health point of view as a highly reprehensible practice, seeing that it practically results in the production of a species of most harmful bodily deformity. In the same way high-heeled boots, by destroying the arch of the instep, and thereby tending to weaken the ligaments of the foot, not merely render walking difficult and

ungraceful, but produce serious and often permanent injury. The use of hair-dyes containing such poisons as lead is apt to produce symptoms of lead poisoning through the absorption of the metal by the system. Thus lotions, cosmetics, and paints are all to be roundly and soundly condemned, first, because they are unnecessary, and second, because they tend in time to destroy the healthy appearance and state of the skin. It cannot be too strongly impressed upon women that unless the body be itself healthy and free from deformities induced by wearing improperly fitting articles of clothing, no hope can be held out for their attaining the ideal of beauty presented by the sanitarian. It has often been urged that sanitary ideals tend towards extreme plainness if not ugliness. This, however, is not the case. It is only necessary to refer back to the women of ancient Greece in order to see how perfect health and the development of a fine physique were facts perfectly compatible with the cultivation of an ideal of beauty which has probably never been excelled in the subsequent history of the world. In the case of the skin it should never be forgotten that health constitutes the best tonic for the body covering. All attempts to use artificial modes by way of improving the look of the complexion are certain in the long run to fail. A skin which requires such artificial and meretricious aids cannot represent a healthy skin to start with, hence it cannot be too strongly impressed, especially upon young girls, that the great foundation of beauty, both as regards the skin and as regards other phases of bodily appearance, must depend upon the maintenance of health.

The Health of the Skin.—In previous sections of this book reference has been made to the care of the skin and to the necessity for the systematic use of baths by way of removing dirty particles, and also for the purpose of preserving the skin in a supple and pliant condition. The use of powder for the skin is not a matter which should receive condemnation where it may be needed to impart a feeling of coolness, or where it tends to subdue slight skin irritation. The habitual use of powder is, of course, not to be recommended. One point here is that the powder should be of a simple and of an absolutely pure description, free from all deleterious ingredients. In all probability face powder which is prepared from pure rice—the *poudre de riz* of the French—is that which presents the highest degree of purity. In cases where the skin is roughened by means of exposure to extremes of temperatures, the use at night of some oily preparations may be recommended. The face should be washed in warm soft water, and after having been dried, pure cold cream should be used as an application. Any excess of the cream should be wiped off with a towel. A formula for the preparation of a pure cold cream

is that of melting together one ounce of pure white wax, two ounces of spermaceta, and half an ounce of almond oil. This should be melted by gentle heat, three ounces of glycerine and twelve drops of otto of roses being added. The ingredients are stirred until they are almost cold, when the mixture is allowed to settle.¹

Skin Greasiness and "Black-heads."—Many women suffer from extreme greasiness of the skin, this being due to an excess of secretion of certain glands of the skin, which exist for the purpose of supplying an oily secretion, rendering the skin supple and also nourishing the hair roots. In this case the skin appears of a shiny and glistening aspect. For this condition nothing is better than to sponge the face with a little white wine of the nature of hock. The face may be bathed with it morning and evening. Where the oily affection of the skin is in excess, it is recommended that a lotion consisting of two grains of sulphate of zinc, eight minims of compound tincture of lavender, and one ounce of distilled water should be used, a little of this being applied twice or thrice daily. Another affection of the skin extremely troublesome is that known as acne. It is an ailment which receives in one form at least the common name of "black-heads," and will be found fully detailed in the section of this work devoted to skin diseases. It may here only be noted that in the common form the "black-heads" represent the tops of the filled-up ducts of the oil glands of the skin, to which allusion has just been made. A little dust accumulates on the top of the plug of oily matter filling up the duct, and hence produces the appearance of a black-head. Such an affection is generally due to defective skin action. The remedy is to press out the black-heads by aid of the finger nails, or by the aid of a watch-key pressed down upon them, a few only being treated at each time. The face should be steamed preparatory to undertaking this comparatively simple operation. After the black-heads have been removed, a little of the following lotion should be applied over the spot: Precipitated sulphur, two drachms; prepared calamine, forty grains; spirits, one ounce; and rose water, nine ounces. Another lotion which is greatly used by skin specialists is that consisting of three drachms of precipitated sulphur, a half drachm of prepared calamine, five ounces of rose water, three drachms of eau de cologne, and lime water up to twelve ounces. It may be here added that acne is an ailment very commonly associated with some slight bodily derangement, and care should be taken to see that the general health is supervised in all its

¹ The excessive use of glycerine, which tends to dry the skin, is to be condemned. No better skin lotion for all general purposes can be used than that made by adding a teaspoonful of simple tincture of benzoin to four ounces of rose water.

details. Very frequently at the time of puberty both boys and girls are troubled very much with acne spots, on the face especially. These will generally yield to the treatment described, but they are to be looked upon as a natural sequence of the beginning of manhood and womanhood, and in a short time tend to pass away of themselves.

The Hair.—There can be little doubt that a fine head of hair forms a distinctive ornament, not merely to the female sex, but also to the male sex as well. Reference has been made in a previous volume to the care of the hair. Here it may only be noted that the hair should be washed with a pure soap once a week or ten days. We should remember the soldier's maxim that "where there is hair there is dirt," and undoubtedly the hair tends to accumulate a large amount of dust particles. After washing with pure soap or with specially prepared shampoo powders, which can be obtained from any chemist, the hair should be rinsed out in cold water and then thoroughly dried. The necessity for the use of a hair preparation varies with each individual. It may, however, here be said that frequent wetting of the hair, as in the morning bath, is to be avoided, inasmuch as this constitutes a frequent source of baldness, especially in men. A simple brilliantine dressing is all that is needed in the vast majority of cases for the preservation of the hair. Such a hair dressing is composed of four drachms of castor oil, twenty-eight drachms of olive oil, twelve drachms of glycerine, four drachms of rectified spirit, eight drachms Jockey Club perfume, and one drachm of tincture of cantharides. The oily constituents of this hair dressing can of course be varied at will, but a caution must here be given against the use of preparations that contain an excess of spirit. Such lotions tend to render the hair dry and brittle, and therefore cause hair weakness. Falling hair may generally be regarded as an evidence of ill-health, hence it is necessary that any bodily condition which may be discovered as tending to produce the affection in question should be duly corrected. Among lotions which may be recommended in cases of falling hair is that used by the late Sir Erasmus Wilson. It consists of strong liquor of ammonia, chloroform, oil of sesame, and oil of lemon, of each half an ounce, spirits of rosemary being added up to four ounces. A little of this should be applied each day. Another excellent formula consists of oil of rosemary, four drachms; blistering liquid, two drachms; sweet almond oil, two ounces; spirit of camphor, two ounces; glycerine of borax, one ounce; otto of roses, eight drops; and tincture of jaborandi, one ounce. The preparation should be labelled "for external use only," a little to be well rubbed into the roots of the

hair night and morning. Paraffin oil of a purified character has had its advocates and supporters as a valuable agent in correcting hair weakness.

Nothing need here be said regarding the care of the teeth. This forms a subject which has already been duly treated in connection with the diseases of the digestive system. For the rest, we may reiterate the remark that good health constitutes not merely the only real foundation of beauty, but also forms the one essential condition for the development and maintenance of the happiness of mankind.

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GENERAL INDEX

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